### The Official Newsletter of the ISPRS Student Consortium



NIPA

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# IN **REMOTE GEOSPATIAL SENSING INFORMATION**

Women Leaders for the Youth

LOL: Ladies of Landsat

**Women in ISPRS** 

**IFOV** Dr. Barbara Ryan

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## NEWSLETTER

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Vincent AZUCENA Amihan MANUEL Sandra PULMANO **DESIGN TEAM** 

RTUU

Andre Jonathan OBIDOS PROOF READER Sheryl Rose REYES EDITOR-IN-CHIEF (OIC)



I am very proud to introduce this very, very special issue of SpeCtrum – Women in Remote Sensing and Geospatial Information. Last March, we celebrated the International Women's month and this issue pays tribute to all the women in the fields of remote sensing, photogrammetry, spatial information science and other relevant fields. We know that there are many more outstanding ladies out there working in our profession and we are hoping that this issue is just the beginning!

I am greatly privileged to have connected with many outstanding ladies to put up this special issue. Meet the young women leading the different student and youth-oriented organizations, namely, IEEE – GRSS Young Professionals, the FIG Young Surveyors Network and the Space Generation Agency Council. Learn more about a platform for Women in STEM – Soapbox Science, lead by Dr. Nathalie Pettorelli and Dr. Seirian Sumner.

It gets better with interviews from the gorgeous Ladies of Landsat! You will find so much inspiration from women across the globe working in remote sensing. We cannot express enough gratitude to Kate Fickas and Morgan Crowley, the awesome ladies behind the Ladies of Landsat! We also extend our deepest thanks to all the wonderful women who gave us their time to answer the interview. Next up is the Women in ISPRS. Know more about the experiences and advices from our very own Dr. Lena Halounouva, Dr. Marguerite Madden and Dr. Anjana Vyas as well as their journey in ISPRS.

Finally, we have Dr. Barbara Ryan, recipient of the Geospatial Hall of Fame awardee for our Important – Focused – Outstanding – Valuable (IFOV) section. Dubbed as the "A Salt-of-the-Earth Woman<sup>1</sup>" in her interview for Geospatial World, Dr. Ryan shares with us her experiences on leadership, her career highlights and most importantly, her advice to women pursuing science and leadership.

Every time I think of women in science, technology, engineering and mathematics, I always remember this comic from Zen Pencils – "The Woman in the Arena<sup>2</sup>." A perfect way to illustrate President Theodore Roosevelt's famous "Man in the Arena" and the popular TED Talks from Dr. Brené Brown. With this issue, I sincerely hope that you find your heroines and female champions who will inspire you to dare greatly. <3

Enjoy reading!

**Sheryl Rose Reyes** 

Chair, ISPRS Student Consortium

<sup>1</sup>Geospatial World (2017, January/February). *A Salt-of-the-Earth Woman*. Geospatial World, pp. 32 – 38. Retrieved from https://www.geospatialworld.net/wp-content/uploads/2017/01/barbara-ryan-directorgeo-secretariat-hall-of-fame-geospatial-world-forum-2017.pdf.

<sup>2</sup> Zen Pencils (2013, December 9). *The Woman in the Arena.* Retrieved from https://zenpencils.friki.cl/ comic/139-brene-brown-the-woman-in-the-arena/.



NSO

FROM THE BOARD

## **EVOMEN** LEADERS IN STUDENT ORGANIZATIONS





"We are capable of anything so never give up and stay confident in your decisions."

### VICTORIA Vanthof

GRSS Social Media Ambassador

Phd Student, University of Waterloo, Ontario

Term:/duration: 2 years

### Can you give us a brief introduction about your organization? How were you introduced in this organization? What made you decide to take on the leadership role?

IEEE GRSS is an international society that is focused on the theory, concepts, and techniques of science and engineering as they apply to the remote sensing of the earth, oceans, atmosphere, and space. In 2016, I joined as a student member and since then I have grown within the organization and taken on leadership roles.

was first introduced to the organization when I attended the society's annual conference (IGARSS) in July 2017. At the time I was a first year Master's student and was giving an oral presentation at the conference. Prior to the conference, I attended a summer school that GRSS organized and I luckily met some great individuals also travelling to the conference the following week. Since it was my first international conference and I was attending without any of my fellow colleagues, I was extremely nervous. My nerves quickly subsided when I arrived at the conference and realized how inviting and easy it was to meet others with the number of events the conference provided. During the week, I found out about other opportunities such as the women and women mentorship program and other avenues to get involved with GRSS. I highly recommended the mentorship program also. It is another avenue for women to help support each other and specifically for mentees who are in a STEM career field.

I again attended IGARSS the following year and found out about other upcoming opportunities with GRSS. I expressed interest in working with GRSS from the beginning because they are a great society and I am excited about where they are going. So, a few months after the conference I was approached about a new role within the society and this is when I decided to become a Social Media Ambassador (SMA). I am only a few months into starting this new role with the organization but so far it is going extremely well. I am a young woman in a heavily male dominated field and I think it is so important to incorporate women in these embrace challenges and change. For me, that roles.

### Can you provide us with your contributions / plans for the organization's future? How do you think women leaders contribute in the overall development and progress of your organization / profession?

Well there is a lot in the works and the next few years look very exciting. For the GRSS and my new role, we are working to substantially expand its social media presence. Mustafa Ustuner is leading our team of SMAs and we hope that the remote sensing and geoscience community can become more involved and informed about the various activities going through social media outlets like Facebook, Twitter and LinkedIn. Information on GRSS technical committees, young professionals and Women-in-Engineering activities, the Industry Forum, and the annual IGARSS Student Paper Competition are all great resources and opportunities to be aware of. Women leaders contribute substantially to the overall development and progress of the future. On the SMA team alone, five out of the six SMAs are female, which is awesome. Beyond this, for the Women Mentoring Women program, women who are further along in their career are helping younger women just getting started in the field. This is extremely helpful and allows us to grow more confidently and successfully. Women leaders are everywhere and we just need to acknowledge this and I am excited to be a young woman working with GRSS in my SMA position and hopefully inspire women to push boundaries, aspire to be great and to just be themselves.

### What is your advice for the young women aspiring to be leaders?

We are capable of anything so never give up and stay confident in your decisions. Yes, women in STEM are outnumbered by men but the divide is lessening. I would advise young women aspiring to be leaders to just do what you love and have passion for it. Along the way, make sure to reach out to other women along your journey because having support and an inspirational network of people is so amazing. Mentors are so important so make sure you have the time with them to the fullest extent. Also, has helped me figure out what I do and don't like.

### your organization? How were you organization / profession? introduced in this organization? What made you decide to take on the leadership role?

(Geoscience and Society) of IEEE (Institute of Electrical have part of "this world". The women and Electronics Engineers), a non-profit have instincts and natural abilities that organization that helps and supports contribute to the organization's (and the research and education in Remote profession's) improvement. To think in Sensing and Geoscience area and small details, listen more to the people, promotes connections between the encourage the group (motivation), be academia, overall society and industries. comprehensive, be patient, accomplish Last year our university (Federal multiple tasks, work under pressure, University of Mato Grosso do Sul -UFMS) hosted the event "GRSS IEEE each more, be flexible, management and Young Professionals & ISPRS Summer organization are some of these natural School 2018" in Brazil, and I helped and participated in this event. I also learned about the societies involved. Professor José Marcato Junior (one of the organizers of this event) told me that we could form a chapter and invited me to lead. I was surprised and glad for this. I accepted because I saw a chance to help students to know about Remote Sensing and Photogrammetry, areas that fascinate me, and contribute to society and the environment.

Can you provide with us your contributions plans / for the organization's future? How do you think women leaders contribute in the overall

## Can you give us a brief introduction about development and progress of your

I want to contribute to promoting and participating in the construction of knowledge, science, human and We are a chapter from the GRSS environmental valorization, encourage Remote Sensing the people, especially women to also have sensibility, seek to improvement abilities and instincts of the women, essentials for being a leader.

### What is your advice for the young women aspiring to be leaders?

My advice is trust in yourself, in your capacity and in your team. You might hit some barriers on your way, but don't let negative opinions, differences and prejudices bring you down. Don't give up! Trust! Be strong, be brave, try and try again, change, learn, listen, have faith, get up how many times it will be necessary, believe in the force you have. Do what you love. Fight for your dreams and what you believe. Inspire and inspire yourself.





"**Inspire** and inspire vourself."



Chair, MS GRSS Student Branch Chapter and Univ Federal Mato Grosso do Sul Student Branch

Term:/duration: 2019-2020

Graduate Student, **Environmental Technologies** 





"Leadership isn't about being the best, it's about empowering and helping others achieve."

### **MELISSA** Harrington

International Federation of Surveyors (FIG)

Chair, FIG Young Surveyors Network (2019-2020) I have been participating as a Young Surveyor at FIG events since the XXV FIG Congress in Kuala Lumpur, Malaysia in 2014. Here I attended the 2nd Young Surveyors Conference and the 1st Asia and the Pacific Young Surveyors Meeting. In 2016 I was invited to fill the role of Vice Chair of the FIG Young Surveyors Network for the term (2017 - 2018) and I will now be Chair of the FIG Young Surveyors Network from 2019 to the end of 2020 (start of 2021).

### Can you give us a brief introduction about your organization? How were you introduced in this organization? What made you decide to take on the leadership role?

The International Federation of Surveyors (FIG) was founded on July 18, 1878 in Paris France. It is the federation of National Associations in Surveying and Spatial Sciences and is the only international body that represents all surveying disciplines.

The FIG Young Surveyors Network (YSN) is a vibrant group of students and young professionals from around the world. Originally established in 2006 to encourage more young professionals to participate within FIG, the YSN has grown into a large network. Our network ensures the future of the surveying profession and promotes the work of FIG and it's 10 Commissions. The YSN is active in Africa, Asia and the Pacific, Europe, North America, and South America organizing various meetings, workshops, conferences and training.

I was introduced to FIG through a colleague at work and through my involvement with Survey and Spatial New Zealand (previously called the New Zealand Institute of Surveyors). I was the Young Surveyors Representative to the FIG Working Week 2016 Local Organizing Committee and the Chair of the 3rd FIG Young Surveyors Conference.

I was inspired to take a leadership role by every individual who has been, who is, and who has the potential to be involved within the FIG Young Surveyors Network. Our industry is one of the most exciting in the world! We

are historians, mathematicians, artists, problem solvers, technology geeks and, most importantly, we help people with our skills.

I hope to inspire young surveyors to dream more, learn more, do more, and become more!

Can you provide us with your contributions / plans for the organization's future? How do you think women leaders contribute in the overall development and progress of your organization / profession?

The FIG Young Surveyors Network, in collaboration with FIG Council and Commission Chairs, have developed a Work Plan for the next two years.

The 2019 - 2021 Work Plan introduces initiatives and projects. Initiatives are our key focus areas for the next two years. Each initiative contributes to our vision, which will be achieved by projects led by Young Surveyors. Our success over the next two years will be measured by the creation and completion of these projects. Two key projects relating to our Outreach Initiative is the continuation of the Volunteer Community Surveyor Program with the Global Land Tool Network (GLTN), and Mapping the Plastic with FIG Commission 4 (Hydrographic Surveying). It is our ultimate goal to provide a pathway for students and young professionals to participate in FIG and its wider initiatives.

The surveying industry has great leaders – both male and female! All of whom are great role models and mentors. Traditionally, surveying has been seen as a male profession, and what females in our profession can do is encourage more females to consider surveying as a career.

## What is your advice for the young women aspiring to be leaders?

Here are my top 3:

1. Learn – Learn from others and learn from your mistakes.

2. Have a work-life balance and understand the value of the word "no"

3. Leadership isn't about being the best, it's about empowering and helping others achieve.

### organization? How were you introduced in this who give their time to contribute to the space organization? What made you decide to take on the community and provide more opportunities for leadership role?

The Space Generation Advisory Council (SGAC) in Support of the United Nations Programme on Space Applications is a global nongovernmental. non-profit (US 501(c)3) organisation and network which aims to represent university students and young space professionals ages 18-35 to the United Nations, space agencies, industry, and academia. Headquartered in Vienna, Austria, the SGAC network of members, volunteers and alumni has grown to more than 15 000 members representing more than 150 countries.

Before working for SGAC, I worked for the Arianespace office in Washington DC, United States. My manager at the time was a great supporter of SGAC as an "Advisory Board member. He encouraged me to participate to the different SGAC events in the United States. I attended two of SGAC's global event: the Space Generation Fusion Forum held in Colorado Springs in conjunction with the Space Symposium Conference and the first SGx event held in Washington DC in conjunction with the SATELLITE Conference

Working for Arianespace, my missions were focused on event management as I prepared for the participation of the Arianespace delegation for two major space conferences as well as organised corporate meetings and celebrations (various dinners, receptions etc.). My educational background is non-technical as I studied (for both my Bachelor and Master) Marketing and International Business in France and in the United States. During the SGAC events I attended, I realised we all had something to bring to the table in the space industry (even if you are not an engineer). The strength of SGAC is its inclusiveness, everyone is welcome to join, get involved and contribute to the activities. The organisation also places heavy emphasis on mentorship and story-telling in its activities. Speakers were invited from different companies and they talked at length about how they came to be in the space sector and what their interests were. I could see how important that was for an organisation like SGAC which is trying to inspire the next generation of space leaders. It inspired me to get involved and ultimately applied for the position of Executive Director of SGAC.

As a fairly new member of the organisation, I wanted to contribute using my knowledge and experience in project management, event management and business skills.

#### Can you provide us with your contributions / plans for the organization's future? How do you think women leaders contribute in the overall development and progress of your organization / profession?

I have been working for SGAC for more than 2 years now and it has definitely been a lifechanging experience for me. I had the chance to

Can you give us a brief introduction about your work with dedicated and passionate volunteers student and young professionals to participate. I wish to continue providing opportunities for the youth to take part of the space industry as leaders of tomorrow by organising events, providing scholarships and award, and developing our project groups.

> SGAC acts as a platform to connect the next generation with policy-makers. The goal of the organisation is to be the voice of the next generation in the industry. Gender diversity and the involvement of the young generation in the space sector is still an area where strong progress needs to be achieved. There is a need for dedicated promotion of opportunities for female space professionals within the space sector in general. Likewise, the creation of platforms devoted to facilitate the continued participation of the young generation in cooperative space-related activities and to provide them with professional development opportunities is needed. SGAC has been working on a variety of initiatives aimed at attracting and retaining women and youth to space-related career through global events and professional development opportunities. These initiatives include a platform for professional development, speed mentoring sessions, yearround project groups introducing and exposing our members to different areas of the space sector further enabled by SGAC's numerous international partnerships. SGAC has a strong commitment to demonstrate the importance of diversity and how further involving women and youth can strengthen the global space community.

> SGAC is proud to have more than 40% of female volunteers in its Executive Committee. They take leadership and incremental roles for the organisation such as being a Regional Coordinator for the SGAC and developing our network in the regions, leading the Public Relation & Communication team, the Strategic Partnership team or organising events on behalf of the organisation. SGAC also value and actively promote diversity through events, scholarships, leadership positions and more. An average of 40% of female delegate participate to the SGAC events. A great number of female experts and speakers are also invited to those event to ensure that delegates have female role models to look after and identify themselves to.

#### What is your advice for the young women aspiring to be leaders?

My advice to young women aspiring to be leaders in the space industry it to get involved with communities such as SGAC, Women in Aerospace, the International Astronautical Federation as those are great platforms through which you can meet inspiring female role models and mentors. It also facilitates engagement with other young women from all around the world who have the same passion and similar professional objectives in order to build a solid network which will help them in their career.





"...get involved with communities...in order to build a solid network which will help [them] in their career."

> **CLÉMENTINE** Decoopman

Executive Director, Space Generation Advisory Council in support of the United Nations Programme on Space Applications Term:/duration: 2.5 years



### By Dr. Nathalie Pettorelli

Zoological Society of London Founder, Soapbox Science Editor-in-Chief, Remote Sensing in Ecology and Conservation

When I was a kid, I had no idea that one of my career options included a job where I would be in charge of what I do and why; where I could work with incredibly talented and creative people from all around the world; where I could help solve problems; where I would perpetually being amazed by all the new knowledge, tools and technologies around me.

Being a girl and the first in my family to go to university, I simply wasn't aware that scientist was an actual professional activity I could aspire to – until I met a scientist in the flesh, asked questions, and started to realise that this likely was the job of my dreams.

That little story is unlikely to be unique. Around the world, the representation of women in Science, Technology, Engineering and Mathematics (STEM) continues to be low. Women are still dropping out of STEM careers at a higher rate than men, despite the recent recognition that the science community needs to be open to a larger diversity of individuals to boost its creativity. Many factors have been identified as potential drivers of these trends; some of them relate to the reduced visibility of women in science to the general public, the relative lack of female role models in STEM careers, and the perception that STEM carers are not for girls. To address these issues and misconceptions, we (together with Dr Seirian Sumner) created Soapbox Science, an initiative that aims to challenge stereotypes about what a scientist looks like by inviting women in science to strike a dialogue with people in public places. It started with one event in London in 2011, and 12 brave women standing on a soapbox on the sunny South Bank. Since then, many more events happened, in the UK but also in Ireland, Canada, Sweden, Germany, Tanzania, Australia. Women of all scientific horizons have been participating in these events, including remote sensing experts such as Emily Lines, Merry Crowson, Sheena Fennell or Kari Hyll. This year, Soapbox





Science is expected to hold 42 events in countries that include Nigeria, Ghana, Brazil, Argentina, Belgium, South Africa and the US. The 2019 call for speakers just closed a few weeks ago, with >900 women having applied to speak at one of these events.

Soapbox Science isn't just about organising events and putting women on soapboxes: the initiative is used to bring local organisers, speakers and volunteers together, helping connect scientists who may not know about each other; train participants in science communication and help them grow their confidence in public speaking; share experience and tips about how to build a career in science; and improve the visibility of women in science and the work they do in their home institutions as well as in the media. It's a fantastic vehicle to talk about science and ethnicity; socio-economic background and social mobility; disability; sexual orientation; gender perception. It's a place where issues such as the twobody problem, the imposture syndrome, stereotypes, or the Matilda effect can be discussed. Soapbox connects potential mentors and mentees; investigators and co-investigators; supervisors and students; reviewers and writers; colleagues and friends. Soapbox is thus, first and foremost, a social enterprise aimed at promoting overall diversity in science.

So, if you are searching for one fun, brief, noncommittal thing to do during a weekend this spring or summer, please consider attend one of the 2019 Soapbox Science events taking place all around the world. As a minimum, you'll enjoy the fresh air and relaxed atmosphere. You'll also have a good chance of feeling inspired by the talks and props of our speakers. You could even get convinced to apply to become a speaker with us next year... And if you believe your city could do with a Soapbox Science event, why not drop the initiative an email and potentially become a local organiser or a volunteer? There's no need to identify as a woman to be part of this inspiring community, everyone is welcome. Support is provided, and the experience has been primarily described as rewarding and enjoyable. So why not give it a go?



Follow SoapBox Science on Twitter:

Website: http://soapboxscience.org SPOTLIGHTS

## The Ladies of Landsat

### An Introduction

By Dr. Kate Fickas and Morgan Crowley

We invited a selection of active members of Ladies of Landsat from a variety of geographic locations, career stages, and RS background to submit bios for this newsletter. As you can imagine, the Ladies of Landsat are a busy group of people, so not all were able to respond. We are so grateful to our members who contributed their stories and experiences, and we are excited to share them in this newsletter. Each member's Twitter handle can be found below their photographs.

There are many additional women actively connected to the Ladies of Landsat network, and these bios highlight many but not all of their experiences. We hope to continue expanding these biographies as we grow as a community! Check out our Twitter page @LadiesOfLandsat for more highlights of Ladies of Landsat members!



All background images courtesy of Earth As Art. U.S. Geological Survey, U.S. Dept. of Interior

## The Ladies of Landsat

### Foreword by Dr. Kate Fickas

The night before the Ladies of Landsat Twitter account went live in February of 2018, I stood in a bar in Sioux Falls, South Dakota quietly clutching my frosty IPA and loudly questioning the entirety of my personal and intellectual self-worth inside my head. Noticing my anomalous body language (I'm normally an energetic extrovert, someone took me aside and asked what I was feeling. In a moment of courage and vulnerability I opened up and was endowed a brief, yet powerful, pep talk: "You are so strong. You are so special. I believe in you". In the year that has passed since starting the Ladies of Landsat account, dozens of you have told me similar stories of anxiety and debilitation, feelings of powerlessness, and worse, active discrimination, harassment, and assault in both professional and private settings. However, not all of you have a support system to help guide you back into the light of your own self-confidence. It is my hope we can change that.

Remote sensing is a unique field at an intersection of life sciences, engineering, physics, and computer science. In the U.S., 48% of what the National Science Foundation calls the "biological, agricultural, and environmental life sciences" are comprised of women, but only 15% in "engineering" and 25% in "computer and mathematical sciences"<sup>1</sup>. I know one of the reasons many of us love remote sensing is because of its multidisciplinary nature. However, I theorize this integrative quality has also made it complicated for women in our field to gain traction in being seen and heard with active advocacy in the ways that other, more traditional fields have been ramping up to for some time. For example, while the life sciences are trending towards a near balanced gender ratio, engineering and computer science are still in deep trouble with female representation -- a problem that urgently calls for action. So, where does that leave remote sensing? My experience (and I've heard the same from others has been that remote sensing maintains an attitude of having gender equality, without much data or action to show for it. There's a lot of work left to do.

With a culture in STEM already geared towards competition, it's not hard to feel like a failure when we stumble or compare ourselves to those we admire. This is especially true for women who often already feel like outsiders because of our gender and subsequently feel added pressure to be faultless. However, success does not look like perfection. Success look likes the ability to do what you love with courage, knowing that you have a community behind you to catch you during the rejections, mistakes, and disappointments. I also want to be clear about the other side of the coin: you do not need to have experienced discrimination or the negative effects of sexism to be a part of this community. You do, however, need to believe and empathize with those who have. This goes for men as well. Being an ally means more than simply retweeting women. Among all genders, from what I've seen and experienced, the key difference between self-proclaimed feminists and true allies is action: feminists clap when a player scores a goal, but the ally will try to make the assist.

When we were approached by Sheryl Reyes to have a section on LoLs in this issue of *SpeCtrum*, I knew I wanted it to be more than just research profiles of women in remote sensing. Don't misunderstand me -- the women you will read about are rockstars in their field and the creative pixel pushing they are doing around the globe makes me truly proud to be a part of this community. However, when I think about my journey through the hardships of academia and STEM, what was essential for me was the empathy and storytelling of others who were willing to be vulnerable and share their struggles so that I didn't feel alone and could learn from their wisdom in how to keep showing up in work that I loved. One of my biggest heroines is Reshma Saujani, the CEO of *Girls Who Code*<sup>2</sup> because she advocates and practices the concept "brave, not perfect". Following Reshma's example, we've asked women in remote sensing if they ever had questions about their path, faced adversity that knocked them to the ground, and how they pulled themselves back up. Our hope is that we can begin to shape a Ladies of Landsat community that not only showcases the achievements of women in remote sensing, but also builds a support system for those who might have questions or be struggling in any way.

My dream is for Ladies of Landsat to be a community of all genders that empowers women to be their best selves. If you have a victory, big or small, let us know. We are proud of you and we want the world to know how amazing you are! If you are feeling scared, alone, lost, confused or just need a pep-talk, that's what we're here for too. Have a question, personal or professional you're afraid to ask someone else? Reach out, we won't judge. We are all here to learn. And, finally, if you think you don't have anyone that sees you, please don't worry.

We have you. We believe in you. You are so strong. You are so special. You are a Lady of Landsat.

2. Girls Who Code https://girlswhocode.com/

<sup>1.</sup> National Science Foundation Science & Engineering Indicators 2018 <u>https://nsf.gov/statistics/2018/nsb20181</u>

SPOTLIGHTS

## The Ladies of Landsat

A note on inclusivity by Morgan Crowley

Ladies of Landsat is an inclusive and supportive network for all who personally identify with our community. We work towards elevating our members by increasing awareness of their awesome remote sensing research and supporting those who need a voice. Just as our community is sensor agnostic (Sisters of Sentinel, Madames of MODIS, Gals of GEE, and Dames of Drones, you're all welcome!), we aim for this movement to be inclusive. By using the word "ladies" to describe our community, we are reclaiming a term that sometimes can be used to belittle, patronize or isolate and applying it toward empowerment. All who self-identify as a Lady of Landsat or an ally are invited to join us!

We want to formally state that everyone is welcome in this community. Membership requires support, kindness, and respect for all underrepresented scientists in remote sensing. Our experiences will vary, and so we must actively show up for each other to create access and inclusivity in this field.

Through Ladies of Landsat, we hope to bolster awareness and support and help create opportunities, collaborations and connections for members who were previously isolated. We always invite ideas and feedback on how to make this a reality and please feel welcome to contact us with ideas for how we can work together to achieve this!

## Africa I. Flores-Anderson

NASA-SERVIR-Amazonia Regional Science Coordination Lead & Land Cover Land Use Change Theme Lead





Research: I use satellite imagery to monitor and assess water quality. I have evaluated multispectral and hyperspectral satellite imagery to identify harmful algal blooms in freshwater bodies. In my graduate work I developed an algorithm to derive chlorophyll concentration from Hyperion data. I'm transitioning that algorithm to multi-spectral data. In addition, I'm evaluating a number of environmental variables such as precipitation, land cover change, runoff. water surface temperature, air temperature, solar radiation, wind speed and direction, among others to forecast harmful algal blooms in Lake Atitlan in Guatemala using Artificial Intelligence. This last project is being supported by National Geographic and Microsoft.

**How did you end up in your field?** I got engaged with Geographic Information Systems (GIS) in college in Guatemala. I studied Agronomy Engineering with focus in Natural Renewable Resources. From there on I used geospatial data to monitor and manage better natural resources. Then I started using satellite remote sensing, and it revolutionized my work and the analysis I could make. I got so curious about all the potential applications of this data.

**Have you ever doubted your path?** Yes, many times. When I got frustrated that my accomplishments and hard work were not recognized, or are attributed to someone else. That has happened more than once. A critical point was also when my daughter was born.

**What kept you going?** The feeling that I cannot give up. After working so hard, a new obstacle cannot stop the work I have been building up. and the support of my family and husband.

What does it mean to you to be a Lady of Landsat? That I'm not alone. That we're a community in the same field, full of ingenuity and drive that may be facing the same challenges in our professional careers in science.

Andrea Nicolau

Graduate Research Assistant, University of Alabama in Huntsville and SERVIR

### Huntsville, Alabama, USA



**Research:** I focus on land use land cover change - specifically deforestation and deforestation drivers. I did an analysis in the Madre de Dios region in Peru with Landsat data to see spatial patterns of deforestation. Right now I'm moving to an integrated approach of Landsat and SAR data to identify drivers of deforestation.

ANDS

**How did you end up in your field?** I came from a environmental engineering background, and I got this assistantship to do research using remote sensing data along with pursuing a master's degree in earth system science at UAH through the NASA SERVIR program. I'm originally from Brazil where I had no contact with remote sensing and I'm mesmerized with the remote sensing community now.

Have you ever doubted your path? Yes.

What kept you going? All the people willing to help.

What does it mean to you to be a Lady of Landsat? A network where we can not only share our research but also support each other personally/socially. Makes me feel proud.

# Brianna Rita Pagán

Doctoral Researcher, Ghent University, Laboratory of Hydrology and Water Management

### Ghent, Belgium

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Research: Evaporation is the primary nexus between global water, carbon and energy cycles. Plant transpiration dominates the global flux of terrestrial evaporation. Despite its vital and complex role in climate, most Land Surface Models (LSMs) compute the vegetation response to stress conditions semi-empirically. Furthermore, there is a lack of global continuous observations of photosynthesis and transpiration. Due to the scarcity and limited coverage of in situ observations, satellite retrievals are an attractive means to monitor transpiration. Solar-induced chlorophyll fluorescence (SIF) is a byproduct of photosynthesis: a small fraction of light, initially absorbed by chlorophyll pigments, that is re-emitted as a subtle glow of energy. As water lost through transpiration and carbon uptake through photosynthesis is regulated by stomatal opening, negative anomalies in SIF should integrate the effects of different environmental stressors on transpiration. My research focuses on leveraging satellite observations of vegetation activity (primarily SIF) to improve global transpiration estimates via direct assimilation into evaporation retrieval algorithms. This work allows us to unravel implications in terms of land feedbacks on climate, improve the representation of evaporation in models and aid in real-time drought monitoring.

ANDSA'

How did you end up in your field? I graduated with a Bachelor of Science in Environmental Science and Policy in 2013 from California State University Long Beach and started working at a local water agency in Water Resources. I concurrently completed a Masters of Science in Civil Engineering at Loyola Marymount University, where my thesis focused on modeling climate change impacts to water resources in the Southwestern United States. This is ultimately when I found my passion for research, and transitioned to working at the University of California, Los Angeles as a researcher, spending my summers at Oak Ridge National Laboratory in the Climate Change Science Institute. I had a particular passion for bridging the gap between science and policy in long-term water management planning strategies, and spent a significant amount of time working with water agencies to understand how

those of us in academia can conduct meaningful and useful research for those in the industry. Until this point, my research focused on climate model projections, however I became more and more interested in improving climate models to obtain a better representation of hydrological processes. I began my PhD in Hydrology at Ghent University in 2017 where I now leverage satellite observations of vegetation activity indicators to improve global evaporation retrievals and real-time drought monitoring efforts.

Have you ever doubted your path? I have definitely doubted staying in academia. It was especially difficult adjusting from working in the industry to starting a PhD, while maintaining a work-life balance.

What kept you going? Passion for the environment and passion for doing research. Working on environmental issues like climate change can be overwhelming, and it is easy to question how much your individual work is helping. However, these small contributions from many people are exactly what drive change and tackle these difficult environmental problems. Having a sense of community and the feeling that I am working alongside others are also huge motivators.

What does it mean to you to be a Lady of Landsat? For me, Ladies of Landsat represent the power in sharing stories, swapping ideas and empowering other women in your field. It is vital to have female STEM role models, but there is a deeper impact when you share similar research interests. Academia can be an incredibly competitive environment, but Ladies of Landsat foster camaraderie and support. I really enjoy having a page where I can read about the latest breakthroughs in Remote Sensing and cheer other women on.

# Dr. Caitlin Kontgis

Applied Science Lead, Descartes Labs

Sante Fe, NM, USA



**Research:** During my graduate work, I studied land cover, land use, and climate change impacts on rice paddies in Southern Vietnam. Moving to the private sector, I've continued that research, keeping one foot in academia. Though I used Landsat data exclusively during my PhD, I've adapted my analyses to use Sentinel 1 data, which provides more information in monsoonal tropical areas like Vietnam. Recently, I developed a map of rice paddies across Asia by training a random forest with Sentinel 1 composites and a DEM as feature data. Now we are extending that to also look at the number of harvests per season at a field level. At Descartes, I've had the opportunity to branch out far beyond rice paddies. I've modeled agricultural yields for other crops, looked at deforestation and forest type, and mapped natural disasters, among other projects. The common denominator for all of these different works is the reliance on satellite imagery, remote sensing methods, and a love of solving interesting problems.

ANIDS

**How did you end up in your field?** In college, I took a Geography class to fulfill the math and science GE requirement. I wound up loving it, eventually majoring in Geography at UC Santa Barbara, taking all the remote sensing courses I could. After a detour to Berkeley for a Master's in an unrelated field, I realized how much I missed Geography and remote sensing. While on a trip to Vietnam, I came up with a research idea to study land cover and land use change in the Mekong Delta, and when I got home pitched the idea as a PhD study to a former professor who had moved to the University of Wisconsin. She agreed to take me on as her student, and eventually I got a NASA fellowship that funded my PhD and allowed me to conduct field work in Vietnam. During grad school, commercial remote sensing grew tremendously. Though I thought I would stay in academia, by the time I was applying for jobs, I was really interested in some of the small startups that were popping up. I stumbled on Descartes Labs almost on accident a few months after the company started. Though I knew little about Descartes Labs and had never been to New Mexico, after my

interview I was completely sold on both. When I got offered a job, I was thrilled. I condensed the final year of my PhD into 4 months, graduated, and took off for Santa Fe. I've now been here for over 3 years and lead a team of amazingly talented scientists who use remote sensing data for projects ranging from food security to deforestation.

**Have you ever doubted your path?** I have definitely doubted staying in my field, whether in academia or in the private sector. In graduate school, it often felt like my area of study was too broad compared to friends of mine who were studying finite details of things like bird migration. Then, entering the private sector, I felt too academic and like I knew nothing about anything.

What kept you going? Ultimately, I really love looking at satellite imagery and the pursuit of science has kept me in the field. However, the support network I've cultivated has been integral to sticking around when imposter syndrome creeps in or when work and research becomes particularly demanding.

What does it mean to you to be a Lady of Landsat? Women are underrepresented in the field of remote sensing, and I am proud to be part of a support network for each other. During my career, I've been mentored by many strong, smart women. We have convened AGU sessions together, traveled to meetings like the IEEE Women in Engineering International Leadership conference, and promoted each other's work. It's made a huge difference in my career, and connecting with other women has created so many opportunities I otherwise would not have had.

## SPOTLIGHTS Charmaine Asis Cruz

Senior Science Research Specialist, Training Center for Applied Geodesy and Photogrammetry, University of the Philippines Diliman

### Quezon City, Philippines





Research: With the growing concern of protecting coral reefs, accurate and detailed mapping the reef environment (i.e., including live coral and dead coral) to provide an assessment of this vulnerable habitat is crucial. Due to the complex and spatially heterogeneous nature of coral reefs, it is not easy to map them without analyzing their spectral responses and using remotely-sensed data with high spatial and spectral resolutions. In my study, the synergistic use of two available airborne remote sensing data – hyperspectral Compact Airborne Spectrographic Imager (CASI) image and bathymetric Light Detection and Ranging (LiDAR) data, was assessed for mapping coral reef habitats. The topography of the seafloor was described using the different derivative layers generated from the bathymetric LiDAR data. Airborne hyperspectral CASI image was initially processed to remove the inherent noise in the image and compensate for the confounding effects of the water column. Spectral reflectance signatures of corals and other benthic features collected in situ were analyzed to identify the CASI bands that are useful in the classification. The combined LiDAR derivatives and reduced image bands were used in the classification using Object-based Image Analysis (OBIA) and Support Vector Machine classifier. Field data points and geotagged images from the video tows were used to train the classifier and validate the results. The study identified 578 nm, 620 nm, 675 nm, 690 nm, and 705 nm wavelength bands to separate live coral, dead coral with algae, sand, sand with algae, rubbles and bleached coral. Two sets of classification were implemented -with and without water column correction (using bathymetric information) applied to the image. Classification overall accuracy was increased from 90% to 92% while the kappa coefficient was also increased from 0.85 to 0.90 after water column correction. Live corals, dead coral with algae, rubbles and sand were mapped at 0.5-m resolution with the following accuracies: 78.5%, 89%, 73.5% and 93% before water column correction, and 80%, 91.5%, 76% and 96.5% after the correction, respectively.

How did you end up in your field? My first academic choice was not my last! Geodetic Engineering was not the college major I first enrolled. Remote Sensing was not even the specialization I wanted when I started my graduate studies. But here I am today, a graduate of Master of Science in Geomatics Engineering (Remote Sensing track). I would not be where I am right now if not for my involvement in the first nationwide LiDAR mapping project in the Philippines – the DREAM Program. This project expanded to another research project on mapping of coastal resources using LiDAR and optical imagery, where I became the lead researcher. I was able to work with 14 university teams who are our partners in the implementation of the mapping R&D program. As I took more responsibilities in handling and working with large projects, I started to grow with my profession. These projects gave me the desire for a new career that became my passion. At present, I am working as a senior researcher in our university focusing on the use of Geomatics and other geospatial technologies in addressing various environmental issues.

Have you ever doubted your path? No. Certainly, there have been difficulties, failures, and setbacks as I work towards my career goals, but that does not mean that I have to stop to be proactive, determined, and persistent in becoming a successful woman of remote sensing in the coastal environment sector. I strongly believe that it is about doing what I love and have a passion for.

What kept you going? I am really passionate about working on remote sensing for environmental protection as I enjoy spending my free-time surrounded by the pristine nature. I love that what I have been doing are not only the usual research-oriented but also solution-oriented works. My motivation is to contribute to addressing different environmental issues by providing the local communities with science-based information they need for effective mitigation, protection, and sustainable utilization of our natural resources and environment. It takes a lot of courage and maybe a mindset change to achieve what we are aiming for.

What does it mean to you to be a Lady of Landsat? Being part of this community will give women scientists, especially in developing countries, equal opportunities to extend and strengthen their professional networks, reinforce their full participation and representation in the remote sensing community, and empower them becoming leaders in their chosen scientific research fields.

# Chimira Andres

Graduate student (MSc Geology, Planetary Science), Western University

### London, ON, Canada





Research: There is a ground-breaking amount of evidence that suggests Mars and Earth may be more similar than we think, making it vital to identify the key similarities between both planets, whether it be climate, geological processes, or life. Expanding on further research in glacial and periglacial environments in high arctic regions, my current research focuses on investigating periglacial chronology and landform distribution in polar desert environments. This combines field work and satellite imagery mapping in order to investigate permafrost processes and potential hazard mitigation approaches in the arctic. My goal is to develop a novel, computational method of quantifying spatial variation in patterned ground networks using a semi-automated algorithm within a GIS interface using Earth as a model system for Mars (where similar landforms are seen). This could substantiate the presence of water-ice and possibly the depth of buried ice in relation to these landforms. Additionally, this can also potentially provide accurate mapping extrapolations that will guide in choosing a landing site for sampling Martian water-ice and soil in the near future. Ultimately, my research has significant applications to periglacial landform distribution in the arctic, Earth-Mars analogue planetary systems, permafrost drainage and hazard mitigation, as well as Northern freshwater resources.

**How did you end up in your field?** I became interested in geology and planetary sciences in my first undergraduate research project where we were tasked to plan a mission to Mars. Being a part of this very interdisciplinary project, my group members decided to lean towards their subject of interest either focusing on the: physics of rocket propulsion, mathematical modelling of planetary orbits, types of fuel/combustion reactions, psychology of a manned/unmanned mission, or biology of an analogue experiment. In my case, I focused specifically on the remote sensing, geology, and landing site specifics. With this, at the end of my undergraduate career, I had the privilege

of completing a thesis on glacial lake outburst floods (GLOFs) in the Andes, Perù where I classified the susceptibility of a region to glacial hazards and generated a hazard and sedimentology map. Today, my current research focuses on better understanding and modelling glacial/periglacial analogues on the surface of Mars using Earth-Mars orbiter data.

Have you ever doubted your path? Yes, I have doubted staying in my field and current path as the infamous "imposter syndrome" can be quite prevalent in academia. However, I truly believe that there is always room for improvement and growth and that one can always find ways to be more creative! We are all unique individuals and as long as you love what you do and do what you love, you will always have the drive to keep going.

What kept you going? I truly believe that having a strong support system is key to any doubt as well as developing a hobby that can help you de-stress. For me, that hobby was dance - I have been dancing since I was 4 years old in all genres of ballet, jazz, contemporary, hip-hop, etc. and now, I am lucky to be paying it forward and teaching dance to some pretty awesome kids! I am grateful for having this art form as an outlet where I can express myself in ways that no words can ever describe. Having a clear mind allows me to reassess everything and gain new perspectives not only for my research, but also for my daily life.

What does it mean to you to be a Lady of Landsat? To be a Lady of Landsat is to be an advocate not only for women in STEM but, for equal opportunity in the field of earth observation/remote sensing. In my personal perspective, it is a privilege to be working amongst great leaders and learning from amazing mentors. To be part of a community where women and allies work together towards the common goal of spreading awareness means that in general, we are all making a difference in the advancement of STEM research and science communication.

Dr. Jessica L. McCarty

Asst. Professor, Dept. of Geography, Miami University

@jmccarty\_geo

### Oxford, OH, USA

**Research:** For more than 10 years, my research has focused on fire and food, including the complexities of those natural and human landscapes, systems, and sometimes associated land-cover/land-use change, and extending to the intersections and nexus of these two foci. I use Earth observations and remote sensing and GIS methodologies and models to map, quantify, and create data and knowledge needed to understand and manage food and fire systems.

ANIDS

**How did you end up in your field?** An undergrad professor convinced me to take remote sensing and gis over a pre-law course. From there I went to grad school.

Have you ever doubted your path? Yes.

**What kept you going?** I need the money, and I'm pretty good at this. I think I can make the world better or least more tolerable with my remote sensing skills and knowledge.

What does it mean to you to be a Lady of Landsat? To promote other fine work and to build up representation in our Earth Observation field, especially for women of color, indigenous women, and LBTQ women.

# Jesslyn Brown

Research Geographer, U.S. Geological Survey, Earth Resources Observation and Science Center

### Sioux Falls, SD, USA



**Research:** My science interests span quite a few topics. I have worked on mapping and assessing land cover and land use, tracking the seasonal or periodic life cycles of vegetation, and monitoring the effects of drought. The common thread for all my research has been the application of remote-sensing technologies to help analyze vegetation cycles, track intensification of agriculture, monitor the response of vegetation to climatic hazards, and help people get information from remote sensing in rapid fashion to support decisions. My research has contributed to the development of two weekly indices that quantify the effects of droughts on vegetation nationwide. I have also been involved with investigating change in irrigation across the country and its relationship to water use. For the last year, I have led a large team that is working on continuous mapping of land cover and land cover change covering three decades from Landsat for the U.S. It's one of my most challenging roles and it's been a wild ride so far.

ANIDS

**How did you end up in your field?** I took a bit of a circuitous route and got interested in remote sensing in college while pursuing my Master's. I have a Bachelor's degree in Anthropology and after I graduated, I worked for the National Park Service doing archeological clearance work in a few different National Parks in the Colorado Plateau region. Doing field work, I was asked to draw site maps of archaeological sites we visited as part of the scientific process of documenting the antiquities in Canyonlands National Park. After the project field work was done, I was offered a lab job in Lincoln, Nebraska. Right away, I started attending graduate classes in Geography and Cartography at the University of Nebraska. My dream job at that point was to work for National Geographic (not so realistic!). After I took my first class in remote sensing taught by Dr. Don Rundquist, I was hooked. I loved the data analysis, visualization, and rudimentary programming, although this was back in the 1980s, so our tools and software were pretty prehistoric compared to now. I remember having to "read" Landsat 4 data off of reel-to-reel tapes and believe

me, that was frustrating. After doing class work for a couple of years, Dr. Rundquist told me that he'd gotten a call about an internship up at the EROS Data Center in Sioux Falls, SD. I drove north to EROS for an interview in the spring of 1989 and was offered the internship. Almost 30 years later, I still work at EROS. I had to finish my Master's first, but eventually was offered a permanent position. During my career, I have done science project work as a contractor and as a public servant for the Federal government. I never returned to school to earn my Ph.D. and sometimes I regret that decision. However, I have been able to contribute to my field of Geography and at the end of the day, that matters most to me. I have always enjoyed working on teams and love the atmosphere of scientific brainstorming and collaboration. I have been extremely lucky to mainly work on teams where my contributions were respected and my voice was heard. I know that is not always the case for my female peers. So I do what I can to change that. **Have you ever doubted your path?** Nope, not for 30 years (that's not to say that I don't have bad moments, but thankfully they pass!).

What kept you going? Learning new things has always excited me and the support of many mentors, men and women, have made a huge difference in my career as well. I was taught early, by example, about doing service in science--offering to review papers, to help someone else with a problem, brainstorming ideas...and doing science service has helped me to stay motivated. I'm a little uncomfortable with individual success but really love to be part of a successful team!! All of my career highlights have been related to wonderful teams and seeing those teams succeed.

What does it mean to you to be a Lady of Landsat? It's honestly amazing. I was "forced" to get my Twitter handle when I took a science communications workshop put on by NSF that I was lucky enough to attend in 2012. I never would have sought out social media as a form of communicating science on my own. On multiple levels, I have used Twitter to communicate about my work and my organization, learn about topics that are important to me, learn about new things that aren't on my radar, and support my peers. Crowing about the successes of other women doing science especially in remote sensing is a great pleasure and honor. I was thrilled to be asked to be part of @ladiesofLandsat. Since most of my research has not been based on Landsat, I felt a bit like an imposter at first, but not any more! And I so appreciate the support and validation I have received.

# Joanne White

Research Scientist, Canadian Forest Service, Natural Resources Canada

### Victoria, BC, Canada





Research: Broadly, my research focuses on two themes. The first theme is about improving our capacity to monitor large forest areas over time. Canada has 650 Mha of the most challenging forest monitoring conditions in the world, and I work with a team of collaborators to develop methods and information products that can support science and policy related to sustainable forest management. For this research we rely primarily on Landsat time series data, augmented by airborne lidar and ground plots, to enable national characterizations of forest disturbance, recovery, land cover, and forest structure. The second major theme of my research is on the application of innovative technologies to improve the efficiency and effectiveness of forest inventories and to bridge the gap between strategic and operational forest information needs. This research relies on 3D data, be it from lidar or image matching, to improve the detailed characterization of forest structure at the landscape or forest management unit level. Underpinning both of these themes is the goal to derive better information about our forests to support decision making.

How did you end up in your field? My early degrees were in geography with a strong emphasis on remote sensing and spatial analysis. So forestry was not my initial direction. I did co-op in my undergrad and one of my last co-op placements was with the remote sensing group in the Forest Inventory Branch of the Ministry of Forests. That experience got me hooked on forest remote sensing and from that point on, my entire career revolved around remote sensing applications for forest inventory

and monitoring. When I finished my undergrad, I got a job working with a forestry consulting company as a GIS analyst, and from there segued into grad school, and then returned to consulting with more of a business development focus. I was interested in research and there were so many amazing new possibilities in forest remote sensing at that time. I applied for and was successful in getting a short-term position as a physical scientist with the Canadian Forest Service at the Pacific Forestry Centre (and never left). The rest is history!

Have you ever doubted your path? No, never. But I am glad that I had a broad range of experiences with provincial, private, and federal forest agencies earlier in my career because it has certainly given me a useful perspective.

What kept you going? Science! Excellent mentors, brilliant collaborators, and interesting questions.

What does it mean to you to be a Lady of Landsat? Forestry is a very male-dominated profession. I am used to being the only woman at a meeting, or on a panel, etcetera and I think after some time, you become complacent to that. It's never been a challenge personally, but that is clearly not the norm. So LoL has been important in reminding me that we cannot be complacent and that all of us (men and women) need to encourage, support, and celebrate other women scientists. My collaborators are 98% male (and they are all amazingly talented individuals), but LoL offers a different and broader network, that's also outside forestry.

# Dr. Kate Fickas

Postdoctoral Fellow, University of Massachusetts, Amherst and Research Faculty, University of Utah **Salt Lake City, UT, USA** 



**Research:** Broadly, my research uses satellite, UAS, and other spatial data to map, monitor, and conserve endangered habitats such as freshwater and coastal wetlands. In my M.S. research I used 40 years of annual Landsat data to monitor Oregon wetland change and the efficacy of federal wetland conservation policies. My Ph.D. took that work several steps further and used all available Landsat pixels to model annual wetland condition in Oregon and create maps that yield insight into the ecology, phenology, and hydrology of important wetlands over time. That work is now coupled with wildlife ecologists to investigate the connection between change in migratory patterns and changing wetland habitat phenology and hydrology. My postdoctoral research works towards linking field data, multispectral unmanned aerial vehicle (UAV) imagery, and dense satellite imagery for the purpose of building a coastal salt marsh wetland vulnerability index across the East Coast of the United States.

ANIDS

**How did you end up in your field?** My early undergraduate career began in pre-environmental law. My environmental advocacy started to form when I volunteered with an international environmental law group, Environmental Law Alliance Worldwide (ELAW), and was able to be a small part of a victory protecting Russian landscapes and citizens from steel mill pollution. I even had a brief stint in a naked protest club my freshman year at UC Berkeley! On a whim and the need for an excuse to camp through a national park all summer, I switched gears and began to fall in love with the science of ecology after a summer internship monitoring a grey wolf pack in Yellowstone National Park. Towards the end of my B.S., I had another internship with the Oregon Department of Fish and Wildlife and the BLM where I worked to investigate

habitat and population trends for a critically listed freshwater turtle in Oregon. I loved my time wading through mud and wetlands but became frustrated when a zoning board voted to destroy a wetland that had promise of providing habitat for critical species and instead simply promised to replace the habitat lost with nebulous mitigated wetland space at some point in the future. I decided to shift my perspective from wildlife ecology to landscape ecology in an attempt to make broader conservation impact with my research. Armed with a new interest in GIS and spatial data, I went knocking on doors to see who might be interested in taking me on as a graduate student. I completed both my M.S. and Ph.D. with my advisor, Dr. Warren Cohen, from 2011 - 2018. My early Ph.D. work also involved building a UAV with a team of undergraduate mechanical engineers to validate my remotely sensed wetland sites. With that UAV experience, I was hired by my postdoctoral team to act as the remote sensing expert on our coastal wetland EPA project.

Have you ever doubted your path? Constantly. Most of my uncertainty in this path has come from a worry that I'm just not doing enough for global conservation. Sometimes I feel helpless sitting behind a computer and using data from a machine orbiting the earth 700 km above the planet that's being destroyed. The past year has yielded immense clarity and a loosening of my previous black-and-white view of my career. I got the great advice to trust my gut and trust that things may look very different than what I expected -- and that's not only OK, it's exciting! I've even hopped back into the private/law sector of the environmental field. I now look at my life as an alluvial floodplain rather than a channelized river (I love wetland metaphors). What kept you going? Above all, the support of those who believe in me, especially when I don't believe in myself. Second, learning to let go of the insidious pursuit of perfection and trading faultlessness for vulnerability and self-compassion; at some point my new motto became 'courage over comfort'. Taking risks opens yourself up to getting your butt kicked (and, wow, has mine been whooped), but to grow as humans and scientists, we sometimes have to fledge from our place of stability and take a leap into the unknown. Opening up to those I trust has created more substantial and lasting partnerships and built a safe place to land when things get tough. It also create space to stop confusing external validation with success, happiness, and fulfillment - a realization that has been transcendent for my professional and personal growth. Lastly, and most recently, diversifying my self identity away from my career has been essential to my perseverance. Deep, meaningful relationships outside of work mixed with hobbies like horseback riding, hiking, swimming, and running are all in my pocket when I need them. Feet on the pavement, no one can take away a 10km run; that achievement is mine. What does it mean to you to be a Lady of Landsat? At a conference last year, several months after the LoL Twitter account began, I was chatting with another woman about sexual harassment and unintentionally said the words 'me too' in regards to a specific type of harassment. That moment was pivotal for me and jolted the #MeToo movement out of abstraction and into reality. I'm so proud to be a part of this generation of women: we celebrate victories big and small, we hold each other up, we believe each other, and we offer support in the most dynamic ways. For me, being a Lady of Landsat encompasses all of those values and adheres to an expectation of encouragement, kindness and compassion above all else.

# Dr. Karen Joyce

Senior Lecturer, James Cook University, www.kejoyce.com

### Cairns, QLD, Australia



**Research:** At the moment I am most interested in how we can best incorporate drones into our remote sensing and geospatial workflows. This means that I consider drones to be a platform for capturing traditional style remote sensing data in their own right (i.e. aerial photos to be mosaicked), but also to be more of a field survey tool as well (just as an ecologist uses transects and quadrats). There are so many small drones that are now commercially available, it is really exciting to go from being a remote sensing data consumer to a creator! But this does bring with it a lot of challenges and a steep learning curve in terms of the platforms themselves, the sensors we integrate, and the manner in which we process the data. I am working to try to simplify each of these components to make data collection and analysis achievable to a wider range of scientists and managers.

How did you end up in your field? I never knew what I wanted to 'be' when I 'grew up'. Why do I have to only 'be' one thing or 'grow up' anyway? But this was a challenge after leaving school and not having a clear pathway. I chose geography at uni because they were advertising a field trip to the coast. I like the beach, and I like camping, so I thought - why not? I had never done geography at school. But I loved first year geography and quickly learnt that it was about far more than just learning the names of different countries and their capital cities! In second year I was introduced to remote sensing and I loved it from the first class. I also realised that the best mapping efforts required field survey, so I started to choose topics on the Great Barrier Reef purely so that I would have to go there! My interest in coral reefs continues and I have been super lucky to travel to many reefs in Australia and overseas as part of my research. I feel fortunate to go to places many others can only dream of. When I finished my PhD, I diversified my interests and joined the Australian Army as a geomatic engineer. I was still able to use my geospatial skills here, but in a very different context. I later moved to New Zealand and worked for the Department of Conservation, mapping and

modelling the recreation opportunities across the Conservation Estate. After completing that project I turned towards integrating remote sensing into the disaster management cycle. NZ was certainly a great place to work on natural hazards! I have come a full circle now since my PhD and have returned to Queensland and my coral reef studies. You could say that I've taken the scenic route to get here! But given the chance, I wouldn't do it any other way. I count my range of experiences as one of my greatest assets.

Have you ever doubted your path? I wouldn't say that I have doubted my field, but more so individual positions within it. My career has morphed a lot and while it's always been geospatial, I've been rather transient through jobs.

What kept you going? I love looking at imagery captured from above! Satellite or aerial camera (including drone) - it doesn't matter. I think these sorts of images of our world are incredibly beautiful and are so powerful in terms of providing information about our changing environment.

What does it mean to you to be a Lady of Landsat? I have been working in the field of remote sensing since the late 1990's. I've seen a lot of changes in technology over the last 20 years that have moved our discipline forward in so many wonderful ways. I'd love to say that I've seen the same level of change in the diversity of \*who\* represents that change as well, but I just can't. The fact of the matter is that women are still as underrepresented in our field today as we were 20 years ago. I attended my first academic conference in 2000. I remember being stunned by the absence of women in the opening plenary. I counted 20% women. What had happened to them all? There were plenty of women in my remote sensing class as an undergraduate! Fast forward 20 years to a similar conference, and I counted the delegate listing once more as I have been doing for every conference I've attended since 2000. 16% women. Now I'm not sure that this is a statistically significant decline, but it sure as hell is not an increase. But apparently things are so much better than they were! Don't we have equal opportunity? Maybe I should listen to the people who tell me that there's nothing I can do, because \*women simply aren't interested in these careers\*. Well I cry B.S. We live in a world of bias - both conscious and unconscious. And this is not just considering gender, but in all aspects of diversity. But what if that wasn't an issue? What if we really did consider diversity to be a bonus, not a setback? What if our discipline represented the diversity of society? We have made great advances in remote sensing over the years, but what if we truly had been accessing 100% of our talent pool instead of selling ourselves short? Where would we be today? Where could we be in the future? Women and minority groups need to have a seat at the table. We need to do a better job at making sure that happens. As part of a network of women in the discipline, we have the power to do this for each other and to create support for others who have just as much right to be brought along with us.

# Kelsey Herndon

SERVIR-Amazonia Regional Science Associate, SERVIR Science Coordination Office/The University of Alabama in Huntsville

### Huntsville, AL, USA



**Research:** It is imperative that we understand how complex political, economic, and cultural matters come to bear on the availability and use of natural resources. Through my research, I try to apply a spatial way of thinking alongside our knowledge of these topics to reduce conflict, improve livelihoods, and increase sustainability. My recent research has addressed these themes in central Niger, where I use satellite remote sensing to monitor changing patterns in the seasonal dynamics of small ephemeral ponds, which are essential to the livelihoods of smallholder farmers and nomadic pastoralists.

ANIDS

**How did you end up in your field?** SERVIR is a joint program between NASA and USAID aimed at building capacity in remote sensing and geospatial technology to address pressing environmental needs in developing countries. I work at the SERVIR Science Coordination Office at the Marshall Space Flight Center in Huntsville, Alabama, where I support the SERVIR – Amazonia hub to develop remote sensing/GIS-based services in the areas of drought and fire, water resources and extreme events, ecosystem management, and weather and climate. On any given day I could be writing code in Google Earth Engine, collaborating with our project partners at institutions around the world, delivering trainings on applied remote sensing, or researching new techniques. Prior to joining SERVIR as a graduate student in 2016, I was an archaeologist excavating

and mapping monumental architecture in Central America. Believe it or not, archaeology is where I developed my initial interest in remote sensing and GIS. I started out mapping and modeling archaeological features using GIS, remote sensing, and photogrammetry to better understand ancient landscapes. After learning about SERVIR, I decided to do a career-180, go back to graduate school and change my focus to remote sensing for earth system science. It was initially a steep learning curve, but I am so excited I get to wake up each day and challenge myself to learn something new and exciting that helps to make the world a better place.

Have you ever doubted your path and what kept you going? I have never doubted that I made the right choice when switching careers. Sometimes research can be tedious, or developing a remote sensing solution may only be a small part of solving a bigger problem, which can be really frustrating. However, opportunities to collaborate with researchers from different fields, to learn about new techniques and ideas, and to solve problems with a tangible impact, energizes me to power through any challenges.

What does it mean to you to be a Lady of Landsat? Shortly after joining twitter, I was encouraged to join the Ladies of Landsat community by one of my colleagues (and huge Ladies of Landsat supporter, @BZgeo), and I am so glad I did! It is so encouraging to see updates from amazing women doing incredible research across the remote sensing community. It's not every day that you have a scientific community aimed at building you up, but with Ladies of Landsat I always feel like there is this community of strong women researchers rooting me on from behind the scenes.

# **Dr. Kirsten J. Lees**

Postdoctoral Research Associate, University of Exeter

Devon, England



**Research:** My PhD research looked at how we can use remote sensing to model carbon uptake in peatlands, and particularly how we can use it to monitor the progress of restoration schemes. I did a lot of fieldwork testing vegetation indices in the north of Scotland on blanket bogs which are being restored from commercial forestry. My work used MODIS data to build a simple temperature and greenness model which estimated that bog areas undergoing restoration could reach near-natural gross primary productivity after 5-10 years. I've now started a new postdoc project on ecosystem resilience, where I will be using remote sensing to analyse trends in disturbance and recovery over the last few decades. As part of the larger project I will be looking at peatlands within the UK, and how they are responding to a changing climate and shifting weather patterns.

How did you end up in your field? I honestly never expected to be a research scientist. As a teenager I was concerned about climate change and loved going on school field-trips, so I decided to study geography at university. After completing my BSc and starting work I realised I missed studying, so went back to do an MPhil, and then later a PhD. Across all my projects certain themes have been repeated, including remote sensing, changing climate and weather patterns, and peatlands. I'm now lucky enough to be in a postdoctoral research position which combines all those things!

**Have you ever doubted your path?** During my PhD there were times when I was uncertain if academia was the right path for me. I sometimes felt as though I was making obvious mistakes and therefore I wasn't smart enough to be a 'real scientist'.

What kept you going? I had some great supervisors who consistently encouraged me and told me that I was doing a great job, even when it didn't feel that way to me. I also had a brilliant group of PhD colleagues who supported me through both the struggles and the successes of the process.

What does it mean to you to be a Lady of Landsat? Remote sensing can sometimes seem very complex and mathematical, and therefore something I'm not personally suited to. Having a network of people who are honest about the challenges they are overcoming in similar areas helps me to realise I'm not the only one who finds my work difficult sometimes!

# Dr. Laura Duncanson

Asst. Professor, Department of Geographical Sciences, University of Maryland **College Park, MD, USA** 



Research: I study forest carbon content and dynamics with a wide range of remote sensing (RS) datasets. To date, we still don't know how much carbon is stored in Earth's forests, how it is spatially distributed, and how it is changing through time. I'm interested both in these changes ecologically (e.g. how are intact forests responding to climate change?) and practically (how can we better map and manage forests toward climate mitigation?). My current focus is on algorithm development and application of NASA's two new spaceborne lidar sensors (GEDI and ICESat-2) toward answering these questions. How did you end up in your field? I've loved the academic experience ever since I was an undergraduate, and I always wanted to stay in the academic system - becoming a professor seemed a natural path! I started working in the RS field as an undergraduate res<mark>earc</mark>h assistant studying lidar and forest structure/biomass mapping. I did a second placement studying sedimentology in the Canadian north, and although I completely fell in love with field work (as so many of us do), I decided I wanted to study living systems for my career, and I've been studying trees with lasers ever since! As is the case with many academics, my career path has been sprinkled with random lucky moments that ended up shaping its direction. I did a Masters at the Uni. of Victoria, primarily because it is a gorgeous part of the planet and the research in Olaf Niemann's group fit well with my interests. At the time I thought I wanted to study hyperspectral RS, but Olaf had recently chatted to Jon Ranson at NASA Goddard who has explained the unexplored potential of using NASA's ICESat GLAS for forest studies. This suggestion essentially pivoted me toward satellite RS of forests, and eventually to NASA. The second such event was when I was presenting my MSc research at the American Association of Geographers meeting in Las Vegas - Ralph Dubayah (who I then only knew from his papers) happened to be speaking in the same session as me. I remember being extremely intimidated to present before Ralph, but afterwards he asked me directly if I wanted to do a PhD with him. Little did I know Ralph would not only be my PhD supervisor, but would become a close friend and mentor for the next decade (and

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beyond!). I ended up staying in the DC area for a post doc at NASA Goddard, and have just started a tenure track position back at UMD. Have you ever doubted your path? I have been incredibly fortunate throughout my career thus far, and have not doubted staying on in academia. I think I've benefited from tremendous support at all of my institutions, and do feel that part of any academic success I may have achieved is due to the support of places like NASA and the Uni. of Maryland to promote women in science. What kept you going? Naturally there are struggles for all academics - it is a wonderful and privileged career path, but it is also very demanding. It's extremely fast paced and competitive, and burn out is real. Work life balance is almost laughable. But for me personally what keeps me going is the science itself - RS is extremely exciting. I think we are in a unique age of science in general - now we are more limited by time than by data, and it means that on any given day we could be looking at a new dataset, or using a new algorithm, and we may stumble o<mark>n a fundam</mark>ental discovery about our changing planet. It's like we're professional puzzlers - working our way through the unknowns with these unique puzzle pieces in the shape of raster stacks and point clouds :) It can be a very fun job. What does it mean to you to be a Lady of Landsat? I think it's a very exciting time to be a woman in science, and having a community of women scientists in RS is important for many reasons. I think there is now an appreciation of the importance of supporting women scientists, and many institutions are working hard to make strides toward gender equity, equality and visibility. But there are some inherent inequalities between men and women in the scientific field that are extremely difficult to navigate. The most obvious issue is that the timeline of a traditional academic career means that child bearing years tend to be the years when productivity is arguably the most important toward academic establishment. Coming out of graduate school, unless an academic job is immediately available (increasingly rare in RS when at least a few years as a post doc is the norm for a tenure track hire) there becomes an incredibly difficult trade-off for women scientists who want to have children. There is no good or convenient time to 'take off' from the academic path for child rearing - indeed, this will naturally put women behind their male counterparts in publications, grants, international conferences etc. This is nobody's fault - this is just the timeline of the traditional system. Academic hires are largely based on demonstrated teaching and research performance, and in my experience women who have had children earlier in the game have larger obstacles to getting tenure track positions (and indeed tenure) than those who wait until later, or decide not to have children. Having a support network to address this particular issue, and the many other issues that present disparate obstacles for women in science, provides an avenue for discussion and progress in the field. These community networks can influence the approaches to inclusion at the institutions of their members, and collectively speak in a louder voice than individuals can. They also provide a much needed venue simply to listen to each other's challenges and frustrations, and celebrate each other's accomplishments.

## Laura E. Rocchio

Outreach Coordinator with the NASA Landsat Communication and Public Engagement Team; Science Systems and Applications, Inc.

### Los Angeles, CA USA



**Research:** For the past decade my research focused on the technical history of the Landsat Program. Through extensive historical research and the capturing of oral histories given by dozens of Landsat "veterans" our team was able to piece together and document the twisting path of the Landsat program and the technical and political challenges it faced—challenges that have been "etched" into the historical data archive.

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How did you end up in your field? In college, I had a hard time declaring a major because I was equally enamored with science and with the humanities-then I found Geography, this beautiful place where the two disciplines overlapped. My initial research focus was on coastal geomorphology; after a summer research project using historic charts and aerial photos to map pond evolution on the Chesapeake Bay's Cove Point, I turned my attention more fully towards remote sensing. My first work with Landsat data was as a part-time analyst working on the NASA Humid Tropical Deforestation Pathfinder project at the University of Maryland, where we used massive printed Landsat images, light tables, and GIS to map areas of deforestation in the pan-amazon. As I started graduate school, I had the great fortune to work part-time coordinating logistics for some of the pre-launch validation fieldwork conducted for MODIS land data products. For my Master's Degree in Geography at the University of Maryland my thesis focused on verifying the ability of large-footprint lidar to measure sub-canopy topography. This work was done as part of the pre-launch validation of the Vegetation Canopy Lidar mission (a predecessor to the just-launched GEDI mission). My graduate experience involved lots of fieldwork, lots of coding, and an all-around great cast of colleagues. While finishing my thesis, I realized, that crafting the graphics for the publication was a source of particular satisfaction. This realization helped me choose to take a position with the NASA Landsat Project Science Office (just after the launch of Landsat 7) because the position offered at the time was a mix

of research work (studying afforestation in China) and communication work. My focus shifted towards more communication work as I realized that I really liked being able to step back and tell the big-picture story about research being done with Landsat data. At this point, I decided to go back to school and get another Master's Degree, this time in Publication Design—a program at the University of Baltimore that involved developing expertise in both writing and graphic design. I also became part of the Landsat Legacy Project Team that authored "Landsat's Enduring Legacy: Pioneering Global Land Observations from Space." The book was published in 2017. Today, my job is a mix of science writing, graphic design, and news curating for the Landsat communication team.

Have you ever doubted your path? My path has had many forks in the road and picking which direction to take was not always easy or obvious, but I'm glad I ended up where I am today.

What kept you going? Searching to pursue work that was meaningful to me has been a driving influence in moments of doubt. It is always good to check in with yourself from time to time and ask if you feel like you are being your authentic self. Plus, I find it very motivating be surrounded by people who are passionate about their work, and that has helped me keep going in the direction I have taken.

What does it mean to you to be a Lady of Landsat? It has been wonderfully gratifying to see the number of women involved in remote sensing steadily grow and the number of female role models multiply. As a mother of an eight-year-old daughter, the Ladies of Landsat movement gives me tremendous joy—and I am glad to be counted among them.

# Dr. Maggi Kelly

Professor and Cooperative Extension Specialist, UC Berkeley kellylab.berkeley.edu

Berkeley, CA, USA



Research: I am Professor and Cooperative Extension Specialist based at UC Berkeley. I am dedicated to bringing cutting-edge mapping technology, training, and research support to the ANR and UC network of students, staff, faculty, and the public. My group uses a range of geospatial analysis approaches using data from numerous sources - spatial models, remote sensing, drones, lidar, historical archives, surveys, participatory mapping, and the field - to gain insights about how and why California landscapes are changing, and what that change means for those who live on, use, and manage our lands. The spatial data science field is evolving quickly, and I actively work to build a community interested in applied geospatial research and outreach locally at UC Berkeley and across the state. I am Faculty Director of the UCB Geospatial Innovation Facility (GIF) and Director of the ANR Statewide Program in Informatics and Geographic Information Systems (IGIS), both of which are dedicated to research, outreach and service in support of applied geospatial data and analysis.

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**How did you end up in your field?** I've always been interested in maps, and when I was in college I discovered GIS and was smitten.

Have you ever doubted your path? Of course.

What kept you going? I like maps. A lot. And I like making them.

What does it mean to you to be a Lady of Landsat? It's hugely important to learn about all the amazing work that is happening in STEM by women. I derive a lot of joy and confidence reading about all the work that is going on right now in remote sensing. My twitter feed is loaded with women who are smart, funny, accomplished, political, sassy; and I like to check in on everyone to see what you all are up to.

# **Dr. Martha Anderson**

Research Physical Scientist, USDA-ARS

Beltsville, MD, USA



**Research:** My research group works on generating information about vegetation water use and stress over a range in spatial scales using remote sensing data. With the thermal bands on Landsat, we can map evapotranspiration (ET) down to the subfield scales that are so critical for agricultural management. We use this information to map drought at regional to global scales, particularly the development of flash drought events. At Landsat scale, ET timeseries can inform efficient irrigation decision making, potentially resulting in significant water use savings over the growing season.

How did you end up in your field? I did my doctoral work in radio astronomy at the University of Minnesota, observing supernova remnants with the Very Large Array in NM. While I very much enjoyed astronomy, midway through graduate school I realized I was more interested in things going on here on Earth, and by a sequence of events I ended up auditing a remote sensing class taught by Dr. Marvin Bauer in the Forestry Department. I realized that this is was what I wanted to do. After I completed my PhD, Dr. Bauer introduced me to Dr. John Norman at the University of

Wisconsin, and I spent 10 wonderful years in Madison learning about thermal imaging, land-surface modeling and micrometeorology. In 2005, John's close collaborator, Dr. Bill Kustas, let me know of an open position at the ARS Hydrology and Remote Sensing Laboratory in MD, where I work today. A winding path, but I wouldn't trade one leg of it!

Have you ever doubted your path? While I had second thoughts about prior parts of my path, this one I am quite content with.

**What kept you going?** The support I have been given by many wonderful mentors along the way, and some kind of stubborn streak that kept me from giving up.

What does it mean to you to be a Lady of Landsat? We all need encouragement along our paths, and to feel we are part of a collaboration rather than a competition. Ladies of Landsat celebrates community and the achievements of women - we are not stepping on each other, we are encouraging each other and holding out a hand to help others to the next step. Thank you so much for starting this movement!!

# **Maryam Pourshamsi**

PhD Student, University of Leicester

Leicestershire, UK



**Research:** I use Synthetic Aperture Radar (SAR) and LiDAR imageries to map tropical forest height. The information of forest height is important as it could be used to estimate forest biomass. The more accurate estimate of height, the higher accuracy of biomass estimation. SAR and LiDAR are considered as the two powerful techniques for forest height estimation. Each has pros and cons. SAR is easier to access at large scale whereas LiDAR is more precise with less availability. I use machine learning techniques to combine the two. I use LiDAR sparse samples to train the SAR parameters, and the trained algorithm is applied to an area covered by SAR where LiDAR is not available. The results obtained from this are featured in one of my paper (see this link for my <u>paper</u>).

How did you end up in your field? Where I am now is the dream of my childhood! When I was a high-school student, my dream was to study my first degree in electronic engineering at a good university. But the way that university admissions work in Iran did not allow me to make that at the time. So, I was somehow pushed by my family and friends to study a totally different subject called "Urban Planning". As part of this course, I got to pass a module called Geographical Information System (GIS) which helped me to understand the GIS concept. So, I decided to study it as the main subject for my Masters degree. I got admitted for a GIS Masters course at the university of Leicester, UK. Remote Sensing for Earth Observation was one of the main topics of the GIS Masters course. Studying this module, I realised that such techniques are very powerful and could be applied for ecosystem monitoring. I decided to advance my remote sensing skills, and doing a PhD was the best decision. I was granted a PhD studentship on remote sensing for forest monitoring. During the literature research, I recognised the power of radar remote sensing for forestry applications. So, I choose to apply it for forest height estimation. I have been on three research visits to the radar department at the German Space Agency (DLR)

which I organised with my own initiative. Whilst there, I worked with well-known radar scientist and refined my Synthetic Aperture Radar (SAR) theoretical and practical skills. The researchers who I work and collaborate with for my PhD research mainly studied electronic engineering for their first degree. Maybe I did not get the opportunity to study my favourite subject for my first degree, but I am now doing a related topic for my PhD. I never gave up and I made an alternative route to make my dream true.

Have you ever doubted your path? No, I have never doubted staying in my path. I am just living what I dreamed for.

What kept you going? With no doubts the support that I get from my PhD supervisor (Prof Heiko Balzter) is one of the key motivations. He always supports my research ideas and help me to progress with my research. But off course like many other PhD students, I have had hard times when I felt stress. During these moments, I always look back and reconsider my achievements, and tell myself: "it's not been easy to get here where you are now, so keep going!"

What does it mean to you to be a Lady of Landsat? It means a lot to me to be part of a network of women who are expert in Remote Sensing technologies. This field traditionally has been occupied by men scientists. So, it is very important for me to be part of the community and inspire other women to join. For instance, there are more men scientists in radar remote sensing community than women's. This is not good at all. I would like to encourage all women in the remote sensing society to use radar for their research if applicable. Radar is a complicated technique in general in compare to the other RS techniques. This complexity is for everyone no matter women or men. I would like to encourage more women to be part of this community.

# Dr. Meghan Halabisky

Lead Scientist, Conservation Science Partners

Seattle, WA, USA



**Research:** My research is focused on understanding ecosystem dynamics and landscape change through the development and application of high-resolution remote sensing tools (lidar, aerial imagery, Landsat time series). I work in close collaboration with conservation practitioners and policymakers to co-develop products that are ultimately useful and get used. Recent work has included characterizing the response of wetland ecosystems to historic and future climate by reconstructing surface water hydrographs for wetlands across the landscape in several areas of the US using a combination of aerial and satellite imagery.

**How did you end up in your field?** Straight out of my undergraduate studies I got a job working for a conservation program in Hawaii focused on detecting invasive species through field and helicopter operations. This experience deeply influenced me. It gave me an understanding of the challenges faced by conservation practitioners and the disconnect between application and scientific research. I knew that remote sensing could be a helpful tool for the conservation community and went back to graduate school to get a M.S. and PhD in remote sensing and landscape ecology. Now I am focused on bringing high resolution remote sensing tools to conservation practitioners.

**Have you ever doubted your path?** Yes, although I don't think I realized the reasons behind it until later. It wasn't until the birth of my second child that I began to question whether I should stay in this field. The amount of emotional and physical labor required to take care of two children felt incompatible with having an academic career, especially without the ability to afford full-time childcare in an expensive city like Seattle.

**What kept you going?** I am lucky to work with many deeply passionate conservation practitioners who have been both understanding and encouraging.

They rally me when I feel down and are excited by our collaborations that bring cutting edge technology to their work. Also, I was lucky in my PhD to have an advisor, Monika Moskal, who was understanding of the challenges of new motherhood. It has been helpful for me to have other female mentors in other fields – Sonia Hall and Maureen Ryan – to encourage me and help combat imposter syndrome that sneaks in.

What does it mean to you to be a Lady of Landsat? Until recent years I could count the number of women I personally knew in the field of remote sensing on one hand. When you work in isolation from other women you can't see how more subtle issues like male dominant norms impact you. It's hard to even see how change can happen when you are isolated from one another. To be connected to all of these super passionate, inspiring women is a game changer for me.

# **Dr. Mirela Tulbure**

University of New South Wales→ Assoc. Professor, Center for Geospatial Analytics, Department of Forestry and Environmental Resources, North Carolina State University Sydney, Australia→ Raleigh, NC, USA



**Research:** My research program focuses on using innovative geospatial analytics to improve understanding of surface water extent, vegetation and landscape connectivity dynamics and their drivers of change (e.g. climate and land-use) at regional to continental scales. My approach integrates analysing time-series of terabytes of satellite and other geospatial data (e.g. hydroclimatic data), spatial statistics, and network analysis based on graph theory (a tool commonly used in computer and social sciences). Results of my work underpin improved decision making in water scarce regions.

**How did you end up in your field?** I studied Ecology at the University of Bucharest (Romania) and then did a Masters of Science Degree at Central European University (Budapest, Hungary). I did my PhD and postdoc at South Dakota State University. My postdoc was with the Geospatial Sciences Center of Excellence [the R&D branch of EROS Data Center] and that's when I had a lot of exposure to the Landsat archive and MODIS products, geospatial analytics for environmental change and large area remote sensing.

Have you ever doubted your path? I don't think I ever doubted whether I'd stay in my field or not but I had doubts whether I would get an academic appointment to start with and once there, whether

I'd succeed, given that academia simply has lots of talented people to choose from. So far it worked out for me. Part of it for me is because I was fortunate to have a great team of mentors, role models and sponsors. Another part is that I was blessed with enough challenges along the way to make me grow and appreciate every step forward, no matter how small.

**What kept you going?** The love for my work, the flexibility I have to design studies to answer scientific questions, the beauty and excitement of discovering something new and knowing that through this work you're the first one to try something out. And in the past few years establishing and working with my own team – it's been a highlight of my job to be able to work with and train some extremely clever younger scientists and see them succeed.

**What does it mean to you to be a Lady of Landsat?** I feel very privileged to be in such brilliant company as part of Ladies of Landsat! I really like that the group includes colleagues at different career stages – I believe it's really important in any field in general, and in particular in a technology-driven field, to have scientists of different career stages who bring to the table different perspectives, view points, and skills and who also support each other. I also want to take this opportunity to give a big shout out to Kate and Morgan and for making the Ladies of Landsat happen. Awesome work-thank you!

# Morgan Crowley

PhD Student, Department of Natural Resource Sciences, McGill University

Sainte-Anne-de-Bellevue, QC, Canada





**Research:** The objective of my dissertation is to develop a novel approach for reconstructing detailed fire progressions over large areas for any fire season using observations from multiple sources in Google Earth Engine. We demonstrate how combining observations from multiple sensors can map fire growth progressions for actively burning fires. This fusion takes advantage of the growing frequency and quality of sensors with different spectral and spatial characteristics, capturing near-term growth patterns of long-lived fires to inform managers and planners interested in fire risk, spread, and impact. This work is being done in collaboration with the Canadian Forest Service, including my fellow Lady of Landsat Joanne White and Dr. Mike Wulder.

How did you end up in your field? I spent a lot of time at my grandparents' house growing up because of my parents' work schedules. I would obsess over my Boppa's aerial photographs that he took as an Air Force pilot. In those days, my family and I had no idea that I could create an entire career in remote sensing! In undergrad, I learned that this was a possible career path through RS courses taught by Dr. Margaret Kalacska. I went on to do my MSc at University of New Hampshire studying wildfire-prone communities in the US west. After my MSc, I spent two years mapping land cover changes for Dr. Jeffrey Cardille and started my PhD at McGill in the computational landscape ecology lab in Fall 2017.

**Have you ever doubted your path?** I am proud of the hard work I have put into my developing RS skills! However, I have certainly struggled along

this path. Before I began my undergrad degree at McGill, I had never met a person with a PhD and had no idea that was ` even a career option for me. Because of that, it has often been challenging for me to navigate this system in pursuit of a PhD.

What kept you going? First and foremost, my love of RS has kept me pursuing a career in this field. Second, my family, friends, lab mates, and Ladies of Landsat have been vital sources for support and motivation! This past Fall, 6th graders at North Hampton School (who were in my mom's classroom last year) named me as a "famous scientist" because of the time I spent teaching them about remote sensing and Google Earth last year. When I begin to doubt myself, I try to imagine me from their perspectives because I was once a middle schooler at that school. Third, there have been key academic mentors who have helped me navigate science and valued me as an individual. Their patience and mentorship have helped me sustain confidence in myself over time. I am forever grateful to my former MSc co-advisor Dr. Russ Congalton at UNH, retired UNH geospatial librarian Thelma Thompson, my BEESlab mentor Dr. Elena Bennett at McGill, and my PhD supervisor Dr. Jeffrey Cardille. They have each played a huge role to keep me going in my MSc and PhD through their encouragement and support.

What does it mean to you to be a Lady of Landsat? I'll never forget the pure joy I felt at ForestSAT 2018 when casually talking shop about remote sensing in a circle of Ladies of Landsat members, something that to that date I had never experienced nor realized I was missing. Ladies of Landsat has been a critical network for meeting researchers that I look up to and who I can model myself after. Ladies of Landsat, to me, is a network of potential colleagues, collaborators, mentors and friends.

# Rebecca (Becky) Edwards

Remote Sensing Analyst, National Boreal Program, Ducks Unlimited Canada,

### Edmonton, AB, Canada





Research: The Treaty 8 Tribal Corporation ("Akaitcho") is in the process of developing a land use plan for their traditional territory, a 77 million acre area located in the southeastern NWT. Boreal wetlands represent a large percentage of the landscape and provide critical ecosystem services by helping to mitigate the effects of floods and droughts, provide key habitat for flora and fauna, recycle nutrients, store and sequester carbon, and purify large volumes of water. DUC has engaged in a memorandum of understanding (MOU) with the NWT Treaty 8 Tribal Corporation, in which the two organizations will collaborate on this planning process and other projects related to traditional use and management of boreal ecosystems. The objective of this project is to develop an object-based large-scale wetland inventory for the Akaitcho Traditional Territory using multispectral (Sentinel-2, Landsat 8), and SAR (ALOS PALSAR) imagery. We completed a field campaign in the summer of 2017 to gather training and validation sites, and have combined that data with image interpreted sites and knowledge from the local communities. The final inventory will identify general upland classes, and the five major wetland classes specified in the Canadian Wetland Classification System (bog, fen, marsh, swamp and shallow open water), with more detailed classes mapped in areas of high wetland diversity and importance.

**How did you end up in your field?** I graduated with a Geoscience degree at Vancouver Island University in my hometown of Nanaimo, British Columbia. After completing my first undergraduate research project analyzing temperature and precipitation trends on Vancouver Island, I knew I wanted to continue my scientific research in environmental monitoring using GIS/remote sensing. I attended Queen's University working with Dr. Paul Treitz in the Laboratory for Remote Sensing of Earth and Environmental Systems focusing on assessing vegetation change in the Canadian Arctic using remote sensing. After completing

my masters, I moved back to Nanaimo to start the job hunt. I ended up securing a position with a geomatics surveying company. It was a great experience but I was still searching for a job directly related to environmental monitoring or conservation. Only a couple months later, I got the opportunity to work for Ducks Unlimited Canada as a Remote sensing analyst working to create a wetland classification of the Akaitcho Traditional Territory in the Northwest Territories (NWT).

Have you ever doubted your path? I have never doubted staying in my field. My position as a remote sensing analyst with DUC allows me to work directly on mapping projects related to conservation, as well as, travel to some of the most beautiful locations in Canada to conduct fieldwork (NWT, Yukon, and Northern Alberta).

What kept you going? I find it very inspiring to work directly with the Akaticho community to collaborate on our wetland-mapping product. During our 2017 field season in the Akaticho, we were able to work directly with indigenous technicians collecting vegetation data. From the helicopter, the technicians would point out caribou trails, herds of muskox and snowmobile trails used for trapping. We also conducted multiple community meetings around NWT, and held wetland remote sensing workshops in Edmonton for the technicians. It is rewarding to know that our wetland mapping products will help influence land-use planning decisions

What does it mean to you to be a Lady of Landsat? I feel very honoured to be recognized as an influential woman in the field of remote sensing. It can be challenging for women to define their paths in the scientific community. I believe the Ladies of Landsat are a powerful platform that encourages women to pioneer their own paths, share their research, and support others. The Ladies of Landsat are building a one-of-a-kind support system for woman in our community and I am happy to be a part of the movement.

# Sheryl Rose Reyes

PhD Student, United Nations University, Institute for the Advanced Study of Sustainability



Tokyo, Japan



**Research:** My research is about mapping the supply and demand of ecosystem services, where I use a synergistic approach of using both radar and optical images for land cover classification. Ecosystem services are the "benefits derived from nature" and can be classified into supporting, provisioning, regulating and cultural services. The research aims to understand the current status of the available ecosystem services and how these services are delivered and used by the local population and tourists. These maps will further be used to develop models and scenarios of ecosystem services in the study site, which can help make recommendations about priority areas for conservation and opportunities to help enhance the delivery and use of different ecosystem services.

How did you end up in your field? I graduated with a bachelor's degree in geodetic engineering and a master's degree in remote sensing. My decision to pursue these fields were basically because of my desire to become an engineer and my great interest in Earth observation. In my years of experience, I learned how remote sensing and spatial information science contribute not only to the scientific community, but as well as to communicating the importance of the environment and its conservation to the general public. I decided to further pursue a doctorate in sustainability science because of the work I have done in the academe, for an international environmental organization and for a thinktank. My experiences in these places gave me the opportunity to work with people from all walks of life and with researchers from various disciplines. Today, collaboration is essential and transdisciplinary research is becoming more important if we are to address the world's most pressing environmental issues.

**Have you ever doubted your path?** Yes and I think for many of us, there will always be a phase where we ask ourselves if we are on the right path or if we are making the right choices. There will be detours and bumps along the road, but if

you stay true to what you are passionate about and what you are capable of doing as well as learning how to ask for help, you will most likely find yourself on the right track.

What kept you going? I have always believed in serving others. When I was working for an NGO, I experienced interacting and working with the local communities. I learned so much from local guides and listened to the the long years of experiences of the local people. I believe that by doing scientific work and eventually delivering these information to the local communities, we can help build better a better society. Science is meant to serve the people and I would always be reminded of the words of Carl Sagan, "Not explaining science seems to me perverse. When you're in love, you want to tell the world."

What does it mean to you to be a Lady of Landsat? Being part of a community that empowers women is a great privilege and an extraordinary opportunity! For me, getting to know more women working in remote sensing allows me to envision a brighter future where no one gets left behind. It also means getting to know heroines in this field, that our champions are not only comprised of men but of excellent women striving for progress in remote sensing.

# **Dr. Tanya Harrison**

Director of Research, Space Technology and Science Initiative, Arizona State University

Phoenix, AZ, USA



**Research:** I study small channels called "gullies" on slopes (i.e., craters) in the mid and high latitudes of Mars. They are of huge interest because appear to have been carved by water in the past tens to hundreds of thousands of years—a time when liquid water shouldn't have been widely stable on the martian surface. To make things even more interesting, some of the gullies on Mars are active today! This could have huge astrobiological implications, so we're working to understand how the gullies formed, and what is causing the activity we see today. Part of this involves studying analogue features on Earth, in Mars-like places such as the Antarctic Dry Valleys and Devon Island.

**How did you end up in your field?** I have loved space ever since I was a young child, and became focused on Mars specifically with the Pathfinder landing in 1997. A few years later when it was time to go to college, I thought, "Planets are in space, so I should be an astronomer!" It wasn't until near the end of my junior year that I realized I should've been a geologist instead, so I finished my astronomy and physics bachelor's degree and then made the switch to geology in graduate school to finally study Mars. After my masters, I spent 4 years working for a San Diego-based company that builds cameras for NASA Mars missions. My job was in operations for cameras aboard NASA's Mars Reconnaissance Orbiter and Curiosity rover. Unfortunately, I experienced violent harassment at this company, and ended up leaving to pursue a Ph.D. My experience in industry however led me to my current position upon graduation. I am now the Director of Research for Arizona State

University's Space Technology and Science ("NewSpace") Initiative. In this role, I work with the university and commercial space companies to create partnerships for innovations in technology development.

**Have you ever doubted your path?** Yes. The harassment I experienced at my aforementioned job was so bad that I was ready to leave the field entirely. I literally applied for a job at Starbucks to try and escape that place. Luckily my love of space kept me going, and that experience made me a stronger person and made me committed to doing whatever I can so that women do not have to experience that behaviour and know how to stand up against it.

What kept you going? My love of space. It really drives me!

What does it mean to you to be a Lady of Landsat? To me, it would be a group to help and support each other with questions relating to our science, the data, and careers relevant to remote sensing, while also working to improve conditions for women in the field. We could also think about how to use remote sensing data to help improve conditions for women worldwide—what information is hiding in the data to help women in developing countries, for example?



## The Women in ISPRS

The International Society for Photogrammetry and Remote Sensing (ISPRS) is an international organization comprised of professionals and experts from all over the world. With an increasing number of women actively working in the fields of remote sensing, photogrammetry and spatial information science, ISPRS has also seen an increase in the involvement of women in the organization.

In its early beginnings, only a few women were engaged in the Society. Aino Savolainen from Finland was the first woman to serve in the ISPRS Council as Treasurer for the term 1976 – 1980. She also served as the Secretary of Technical Commission III. During the 1988 ISPRS Congress in Kyoto, Japan, she was elected as an Honorary Member and she was the first woman to receive this distinction up to this day.

Giovanna Togliatti was the next female Treasurer in the ISPRS Council, who served from 1984 to 1988. She continued as the Chair of the ISPRS Financial Commission from 1988 until her demise in 1990. Clarice Norton served as the Secretary of Technical Commission I from 1968 – 1972 and she was one of the pioneers of women leaders in the Society. In the ISPRS Student Consortium (ISPRS SC), Ursa Kanjir was the Chair for the term 2012 to 2016.

For the term 2016 – 2020, Dr. Lena Halounova serves as the Secretary General. Two of the five Technical Commissions (TCs) are led by women, namely, Technical Commission III by Dr. Jie Jiang and Technical Commission IV by Dr. Sisi Zlatanova. In addition, a total of about 48 women are working in the TCs and Working Groups (WGs(. The ISPRS SC is also led by Sheryl Rose Reyes and Angelica Kristina Monzon is the former Newsletter Editor-in-Chief.

The following interviews feature three distinguished women in ISPRS. First, Dr. Lena Halounova, ISPRS Secretary General, who also served as the ISPRS Congress Director in 2012 – 2016. Second, Dr. Marguerite Madden is currently the Finance Officer of The ISPRS Foundation. Dr. Madden was the Second Vice President for the term 2012 to 2016 and was president of TC IV in 2008 – 2012. Dr. Anjana Vyas is currently the Chair of WG V/1 and is the recipient of the National Geomatics Award presented by the Indian Society of Geomatics in 2014.



Aino Savolainen

### For more information, visit:

International Society for Photogrammetry and Remote Sensing (ISPRS): **www.isprs.org** The ISPRS Student Consortium: **sc.isprs.org** 

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### Lena Halounová

Associate Professor Department of Geomatics, Faculty of Civil Engineering, Czech Technical University, Prague Term/Period: 39 years

Can you give us a brief introduction about your career in remote sensing / photogrammetry / spatial information science / other relevant field? What made you decide to pursue a career in this field?

What were the challenges you encountered while pursuing your career and how did you overcome them?

Can you share with us one of the important moments in your career as a woman in remote sensing / photogrammetry / spatial information science / "other relevant field? After having finished my Ph.D., I wanted to teach at the Faculty and the only vacant position was in the Laboratory of Remote Sensing. I started to study again – remote sensing - and a few years later it was decided that the Laboratory was to be responsible for GIS so I had to incorporate it into my knowledge and experience. Since I liked both topics, which fitted together and complemented each other, they became my professional goal.

In the very beginning, working in the Laboratory was my great challenge. I had to prepare courses for Remote Sensing, Fundamentals of Physics for Remote Sensing, Image Processing and, a couple of years later, in GIS. I even had a part time job at a private company for 5 years to get practice in many GIS and remote sensing commercial projects. Presenting results at international conferences and meetings with Prof. Konecny, who recommended me for my first international position in the EARSeL (European Association of Remote Sensing Laboratories) Bureau, opened me, in fact, to the world after representing the Czech Republic in this Association for a few years. I will always be grateful for the interesting co-operation I enjoyed with the many colleagues I have met there since 2005. The next big challenge was the moment when I decided to apply to organize the XXIII ISPRS Congress in Prague. My colleagues and friends in the Department and the Czech Society helped me during the period of the Congress bid and also later with its preparation.

I would not stress "as a woman" but as a *small* woman. I must say that most people I have met helped me "to be seen in group photos". I am not a friend of feminism since I have never felt underestimated amongst the technical society I have been living in since beginning my studies at the technical university. It was my grandmother, who was the only female teacher among male colleagues after the First World War, who was my role model, and neither of us had to fight for it. On the other side, I was the first female Chairperson of EARSeL, I was the first female ISPRS Congress Director and Secretary General and I will become the first female Full Professor of Geodesy in the Czech Republic in June. However, I did not insist on it. I have just tried to produce high quality work, to represent my country and to help people who need it – students who are nervous at an exam, people who do not believe in themselves etc., regardless of gender. Maybe, I was lucky to live in such a country and to have modern-thinking people around me.

### **SPOT**LIGHTS

"I do not think it is a question of a woman or man. It is a question of good, educated and empathic people, people who have an open mind for understanding the development in the environment and the use of our (ISPRS) tools to analyze it in the past, present and future."

How were you introduced to ISPRS? What made you decide to take on the leadership role?

Can you provide us with your contributions / plans for the future of ISPRS? How do you think women leaders contribute in the overall development and progress of your ISPRS and your profession?

What is your advice for the young women aspiring to pursue a career in science and engineering as well as become leaders? I participated in the Istanbul Congress in 2004 and Beijing Congress in 2008. My husband convinced me to prepare a bid for the 2016 Congress in Prague. It was a chance for my country to bring the ISPRS Congress, 106 years after its foundation, to the country where its founder, Eduard Doležal was born. The Czech Society, of which I am the chairperson, supported me and helped me very much during the Congress preparation and continues to do so even now.

I do not think it is a question of a woman or man. It is a question of good, educated and empathic people, people who have an open mind for understanding the development in the environment and the use of our (ISPRS) tools to analyze it in the past, present and future. The main task is to co-operate with experts from other societies to share our knowledge and experience in the complex modelling of the exploitation of the Earth and its impacts.

There are two types of career women. The first group are those who dedicate their life fully to their career. My advice for them: Do your work as good as you are able to and behave like a decent and modest woman. The second group wants to divide their life between work and family. My advice for them: Don't be afraid to combine it. Don't give privilege to the work, because you are a mother and a wife first. Choose a tolerant husband who will be your supporter, the same as you will be his under all circumstances. An open mind and good humour will help both groups of women. It is my recommendation, taken from an old Czech proverb: Healthy soul in healthy body.

### **SPOT**LIGHTS



### Marguerite Madden

I was fortunate to have parents who both loved mathematics and science. My mother was a

Professor

Department of Geography and **Director** of the Center for Geospatial Research University of Georgia, USA Term/Period: 29 years

math and physics major as an undergraduate at the University of Vermont in the early 1950s, one of two women in her major. My father earned a degree in civil engineering from the same university and he was a licensed land surveyor. I started working with my father when I was 11 years old doing surveying fieldwork and he taught me how to use a transit, clear a line of sight, and make accurate measurements with a metal tape in the forests and fields of northern New York near the Canadian border. Our dining room table was often covered with maps, field notes, and slide rules so I was introduced to mapping and coordi-Can you give us a brief nate geometry at an early age. My love, however, was biology and I entered college as a biintroduction about ology major with the intent of being a veterinarian. As is often the case, a single class with a your career in remote dynamic professor changed my career trajectory. Introductory Ecology opened my eyes to broad-scale studies of the complex relationships among the physical and biological composensing / photogrammetry / nents of landscapes. At the time, my instructor's good friend was a geography professor spatial information and they fished together on Lake Champlain, the sixth largest lake in the United States afscience / other ter the Great Lakes. In response to a Canadian proposal to regulate the level of the lake to relevant field? What allow development along the outflowing Richelieu River, an international commission fundmade you decide to ed a remote sensing study to map all of the wetlands that would be affected by controlled pursue a career in this lake levels. I was hired as a work-study student in 1976 to help with this grant and found field? myself involved in all aspects of a wonderful remote sensing project. I canoed into wetlands to identify aquatic plants. I flew in a single engine Cessna 172 to acquire 70-mm format color and color infrared aerial film positives with twin Hasselblad cameras mounted to the aircraft wing struts. I manually interpreted wetland vegetation communities and projected plant boundaries fit to base maps using a Kelsh stereoplotter. I learned cartography and made wetlands maps on vellum paper using ink, Leroy lettering, and drafting tools. This single research experience as a second-year undergraduate student influenced my decision to pursue graduate studies combining ecology, geography, remote sensing, photogrammetry, and cartography, adding GIS and computer modeling as these technologies emerged.

What were the challenges you encountered while pursuing your career and how did you overcome them? My first challenge as an undergraduate student was having my advisor (who was assigned to me when I declared my major as biology) telling me I was not suited for a career in biology because I was a girl. I solved this by finding a new advisor who did not hold my gender against me. My second challenge was receiving five rejection letters when I applied to Masters' of wildlife ecology graduate programs. I wanted to use remote sensing to study grizzly bears in Alaska, panthers in Colorado, or elk in Montana. While waiting a year to reapply, I worked for a construction company as an engineer's assistant earning \$5 per hour. In order to receive federal funding for their road construction project near the Canadian border, the private company hired two African American men, one Native American man and two women. It was not uncommon for me to be told I was taking a job away from a man who needed to support his family. I kept my head down, arrived at the job site 30 minutes early each morning, worked outside in all types of weather and gradually earned my co-workers' respect and a raise to a labor's wage of \$13 per hour. In the meantime, I applied to 10 Masters' graduate programs and after nine rejections, was accepted into one.

Can you share with us one of the important moments in your career as a woman in remote sensing/ photogrammetry/ spatial information science / "other relevant field? As a young woman in the late 1970s and the early 1980s, I found myself in the early wave of women transitioning from the limited career choices of my mother's generation to expanded opportunities for women in STEM careers in science, technology, engineering and math. Although the universities and graduate programs no longer excluded women, women were still the minority and there were few examples of women navigating school and family responsibilities. The year 1980 was a turning point in my life and career path, when I married and learned how to adapt my plans without losing sight of my goals. When my son was 6 months old, I took a summer field biology class at the nearby State University of New York. I bundled him in a baby carrier front pack and took him with me on our botany trail walks. That fall I entered the Master's program in Biology. My son was three years old when I graduated and hoped to find a part-time job in natural resources that would allow me to spend time at home. This changed in an instant when my husband told me he wanted to return to school to pursue a degree in fine arts. I saw my chance to pursue my doctoral degree and we selected the University of Georgia with graduate programs in art, ecology and remote sensing.

My Ph.D. advisor, Professor Roy Welch, introduced me to ISPRS and invited me to be involved when he was the Chair of a Working Group in Commission IV (WG IV/5, Geographic Information Systems) from 1988 to 1992. During this term, I helped him as the WG Secretary and attended my first ISPRS Congress, the 1992 Congress in Washington, DC. I became the Secretary of Commission IV when Professor Welch was elected Technical Commission President for the 1992-1996 term. He introduced me to the duties of ISPRS leadership roles and I was especially fortunate to have the opportunity to travel with him when he attended Council Meetings and ISPRS Symposia and Workshops. In a way, it was a type of ISPRS apprenticeship. I was able to participate in the organization of the Commission IV Symposium held in Athens, Georgia in 1994 and attend the Council Meetings leading up to the 1996 Congress in Vienna. In the 1996 to 2000 term, I was the Secretary of Commission IV Working Group 2, Digital Terrain Models, Orthoimages and 3D GIS with Professor Welch as Chair. I attended the 2000 Congress in Amsterdam and became the Chair of WG IV/6, Landscape Modeling and Visualization. In 2001, I was also elected the Assistant Director of the ASPRS GIS Division. In these early leadership roles, I was introduced to conference organization, editing special issues of professional society journals, attending Board Meetings, serving on award juries, and learning about the policies, structure and operation of professional societies. It was a challenge for both my husband and me to juggle work and family responsibilities, but I absolutely loved traveling to other countries and meeting international researchers. In 2004-2008 I was Co-Chair with Professor Jochen Schiewe of the ISPRS WG IV/4, Landscape Modeling and Visualization and in 2005, I was elected Vice President of ASPRS advancing to President in 2007. In 2008, I was elected Technical Commission President of Commission IV, Geodatabases and Digital Mapping and ISPRS Second Vice President serving on the Council from 2012-2016. All of this is to say taking on leadership roles in ISPRS was a gradual process for me. Over many years I followed the examples and guidance of many amazing leaders in both ASPRS and ISPRS, first of all being my advisor, mentor, and friend, Professor Roy Welch.

How were you introduced to ISPRS? What made you decide to take on the leadership role?

## *"Try out different professional societies and select those that introduce you to exciting ideas, people and places."*

Can you provide us with your contributions / plans for the future of ISPRS? How do you think women leaders contribute in the overall development and progress of your ISPRS and your profession? I am currently the Chair of ISPRS Working Group IV/6, Spatial Data Infrastructure: Internet of Things and Spatial Decision Support and I have served since 2010 as the Finance Officer of The ISPRS Foundation. I look forward to attending my eighth Congress in Nice, France next year, and I am thrilled to have so many talented and active women filling roles of ISPRS leadership from the Working Group to Council levels. Professor Lena Halounova, from the Czech Republic, was the first female ISPRS Congress Director and Secretary General, Dr. Jie Jiang, from China, was Technical Commission President of Commission IV (2012-2016) and is currently the Technical Commission President of Commission III (2016-2020), while Professor Sisi Zlatanova, from The Netherlands and now Australia, is Technical Commission President of Commission IV (2016-2020). Many women this term are ISPRS WG Chairs, Co -Chairs and Secretaries and the mission of ISPRS to increase its diversity in gender, race and geographic representation is increasingly being met. There is still progress to be made both within our society and our profession, but all aspects of geospatial research, practice and training is benefiting from our multiple perspectives, backgrounds, skills and strengths. In my opinion, the most important contribution women leaders make is moving past "first female" titles to a time when diversity in ISPRS leadership is the norm instead of the exception. My hope is young people all over the world will have the opportunity to reach their full potential in geospatial careers and address our global challenges.

What is your advice for the young women aspiring to pursue a career in science and engineering as well as become leaders? I would advise young women to be active and engaged in all aspects of their studies and careers in science and engineering. Master fundamental concepts and theories in your coursework and then take challenging courses in emerging areas of artificial intelligence, machine learning, and deep learning. Learn non-scripting computer languages and fly drones. Start your own businesses. Process large data sets and gain experience producing map products, web portals and mobile apps. Apply for internships, study abroad, volunteer with NGOs, or create your own. Teach young girls and boys about science and engineering. Let them witness your own love for learning, new ideas, technologies, and analyses. Develop algorithms once you thoroughly understand the systems. Consider social, economic, environmental, physical, and biological aspects of every problem. Question the accuracy and validity of data you glean from the web. Use only quality data in your models and understand/check all of the intermediate steps in your analysis. Avoid black-box solutions. Connect with your peers to find support, ask questions and share success. Remember search engines are your friend, social media is a powerful tool, and real-life family and friends are invaluable. When your research is ready to share with others, attend conferences and present your findings to anyone who will listen. Try out different professional societies and select those that introduce you to exciting ideas, people and places. All professional societies need help and they will welcome your involvement when you are ready to take on roles of leadership. I hope you find ISPRS to be such a society and I predict a more diverse and transformative ISPRS is in our not-so-distant future.

### **SPOT**LIGHTS



Anjana Vyas Executive Director Centre for Applied Geomatics, CRDF and Adjunct Professor Faculty of Technology, CEPT University, Ahmedabad, India Term/Period: 39 years

Can you give us a brief introduction about your career in remote sensing / photogrammetry / spatial information science / other relevant field? What made you decide to pursue a career in this field?

What were the challenges you encountered while pursuing your career and how did you overcome them?

Can you share with us one of the important moments in your career as a woman in remote sensing / photogrammetry / spatial information science / "other relevant field?

After completion of one year study on Remote Sensing from Indian Institute of Remote Sensing (IIRS), Dehradun in 1987-88, the first thing I did was to introduce 'Remote Sensing for Planners' subject at CEPT University. In 1993, the GIS subject was included. These subjects received an overwhelming response from the students. When it was decided to offer a Masters' level programme in 2006, I designed the syllabus and started the Masters in Geomatics degree. After a few years, the degree was enhanced as M Tech in Geomatics. My professional journey in Geomatics started as a subject faculty, then the course developer, Geomatics Programme Coordinator and lastly the Dean of a Faculty of Geomatics and Space Applications. It was my privilege to be a pioneer in introducing the Masters/ M Tech course in Geomatics in the State of Gujarat. Geomatics is one of the specialisations advancing at a fast pace. It is a field with ancient roots, modern relevance, and an eye to the future. Geomatics has immense capabilities of decision-making spatially. Being an educator, I feel proud for succeeding in creating interest and cultivating motivation among the students and the young scientists to learn such a thriving subject.

The challenges are many, but most important is how we take on these challenges. I have learnt to consider the 'challenges' as 'opportunities'. The first challenge was a 'total change in discipline' for me. I am an Economist - Planner. I had no clue on the subject, Geomatics, before I went to IIRS, Dehradun for study. The subjects were very interesting, with a well-structured syllabus and highly experienced faculty members. I experienced that the knowledge I gained at IIRS has great wealth useful for the planning discipline where I belong to. It is also relevant to the rest of the specialisations offered in our University. I have successfully added 'Geomatics Scientist' to my calibre as a 'Social-Scientist Planner'. The second challenge was 'to develop infrastructure' for the teaching of Geomatics at CEPT University. During the early years, no personal computers or software were available at affordable price. Also, we needed to procure the equipment for optical analysis of satellite imagery but no budget was allocated for this. 'Borrow and Beg' from the Space Applications Center, and an accomplished search for external funds made it possible to establish a sophisticated and well equipped GIS Lab with optical instruments, personal computers, and the GIS software. The third challenge was to 'find the students' who are interested to study Geomatics - nowhere! Most students want to continue masters in their respective specialisation of bachelor degree. Geomatics is not mainstream; very little is known about Geomatics. even today. Motivational talk and proper counselling facilitated in breaking the monotony. At present, the Geomatics Programme is well set and established with full capacity students and the faculty members at CEPT University. The fourth challenge is to 'Be with the Advancements', remain up-to-date academically. This requires periodic update in the syllabus, which complies the advancements in the technology and the need of the industry, government and other stakeholders of Geospatial Technology. I conduct Industry-Academia Collaboration Meets, Symposiums, short-term training programmes along with brain-storming meetings to convey the dynamics of the developments. These activities are forming strong support for changes in the curriculum. Research projects I carry out are the other means to improve the competences. Most crucial, as a leader, is to motivate the faculty members to cope-up with the advancements.

hus Not many women are in STEM (Science, Technology, Engineering, and Mathematics). It was a great moment for me when, along with four male trainees, I, the only female trainee, receive A+ grade in all the subjects when studying in IIRS, where I had no knowledge about the subject before joining the programme at IIRS, Dehradun, the same was not a case with others. It was a moment of honor for me to receive a National Award on Geospatial Applications, where two of my mentors, both male, Dr. Baldev Sahai and Dr. N. C. Gautam, were also awarded on the same dais, in the same function. I have remained fortunate for more than a decade, to give my services to one of the very important mandates of Government of India's gender mainstreaming proeld?

### **SPOT**LIGHTS

*"Your strong willpower will change your destiny to your favour. Do not underestimate your strength and capabilities. Think high, achieve high."* 

How were you introduced to ISPRS? What made you decide to take on the leadership role?

Can you provide us with your contributions / plans for the future of ISPRS? How do you think women leaders contribute in the overall development and progress of your ISPRS and your profession? Future Plans for ISPRS: Large scale penetration of devices and the Internet has disrupted not only industry and governance alike, but also changed day-to-day life of the users. Familiarity with technology is enabling individuals and organizations to manage and utilize information in unprecedented ways. Geoinformatics domain is one of the key examples where advance technical capabilities like navigation, spatial search and visualization is made accessible to everyone. Therefore, there is a need for the standardization of syllabus at various levels and a strategy that will make it easier for the learner to discover suitable learning resources for individual needs. The future plan focuses on identifying on the opportunities, challenges and offer some plausible solutions and to determine appropriate curriculum, pedagogy and evaluation strategies for each level. Contribution in national capacity building programmes in the specialized field of geospatial technology and applications through education, training, research and outreach activities. Emphasize on geospatial technology training to the 'Women in Science'.

In one of my visits to the Space Applications Center, Ahmedabad I came to know about ISPRS. I participated in Goa and Hyderabad Conferences of ISPRS. Those conferences have created

interest in me. I browsed the website and gathered more information. Dr. Martin Mollenar

proposed, Dr. Kohai Cho seconded my candidature and I became a Working Group Chair, TC

VI/WG 2, during ISPRS Congress 2012. That was the beginning for me as an active and offici-

ating member of ISPRS. During the first leadership tenure, I am awarded Presidential Honorary Citation at Prague during ISPRS Congress, 2016. At present I am a Chair of TC V/WG 1.

What is your advice for the young women aspiring to pursue a career in science and engineering as well as become leaders?

Be sincere not serious. Be ambitious not modest. Be courageous. Your strong willpower will change your destiny to your favour. Do not underestimate your strength and capabilities. Think high, achieve high. Women in Indian myth are considered as symbols of Strength, Wisdom, and Knowledge, meaning innovative and creative. Innovations and creativity are the synonym of Growth. Be innovative, be creative. So keep faith in yourself and perform accordingly. The world is yours. Best Wishes.

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## BARBARA J. RYAN Former Director Group on Earth Observations (GEO) Retired



Under Barbara J. Ryan's leadership, millions of satellite images and other Earth observation data have been made available to the general public at no charge, allowing scientists, planners, and policy makers to make better-informed decisions on problems that transcend political boundaries. Her work addresses critical issues in agriculture, biodiversity, climate change, disaster planning, energy, health and water.

From 2012 to 2018, Ryan was the Secretariat Director of the intergovernmental Group on Earth Observations (GEO) in Geneva, Switzerland, an organization comprised of 104 Member States and the European Commission, and 126 international scientific, technical, and development partner organizations.

While at GEO, Ryan worked to integrate Earth observation systems from around the world into a single, comprehensive system that uses coordinated data to understand how environmental factors impact human life. Like Ryan's career body of work, the system helps guide decision makers toward better agricultural, energy, and land-use decisions.

After graduating from the State University of New York (SUNY) at Cortland with a degree in geology in 1974, Ryan joined the United States Geological Survey (USGS), the nation's largest civilian mapping agency. She became an expert in groundwater contamination and was eventually selected as staff assistant to the Department of the Interior's top official for water and science issues.

Ryan advanced steadily in the USGS, earning master's degrees in geography from the University of Denver and in civil engineering from Stanford University along the way. As associate director for geography at the USGS, she was responsible for the agency's remote sensing, geography, and civilian mapping programmes, including the Landsat satellites. It was during this time that she led the effort to change the decade-old Landsat data policy to full and open, an action resulting in more than 90 million Landsat scenes being downloaded globally to date.

Can you give us a brief introduction about your career in tions, and I can honestly say that the joy of experiencing this geospatial information and Earth observation? What made "power of place" has never wained. you decide to pursue a career in this field?

Growing up in a small (population: 250) rural community in your career and how did you overcome them? Upstate New York during the 1950s and 60s was without a doubt what led me to a career in geography. We spent endless hours - rain, snow and sunshine - playing outdoors. Some of my fondest memories are building boats out of twigs and racing them in the creek that traversed through farm fields near our house. To see, firsthand, the integrated landscape and all its functions had a profound impact on my views about "place" and ultimately the "power of place". My first technical position was with the U.S. Geological Survey (USGS), the nation's premier civilian mapping agency, and I can still recall the pure joy of seeing features on the landscape match their characterization on the relevant topographic map. Over the next 44 years, I worked in seven U.S. States, Washington, D.C., and Switzerland, holding a number of posi-

What were the challenges you encountered while pursuing

When I began my career - and even before that in college, university and graduate school -- the percentage of women in geology, geography and civil engineering was only about 10 or 20%. Women were almost always out-numbered by 5:1. I spent a fair amount of time reading about the specific challenges that women face in male-dominated disciplines and organizations, and. as a result, I could see that I was (inadvertantly) exhibiting some of the same behaviors that were career-limiting. I also joined a women's networking group that provided great opportunities for discussing challenges and opportunities in the workforce. Lastly, finding mentors throughout one's career that will give truly candid

"That is not to say that every day will be equally rewarding, or that there will be no frustrations or setbacks – all of which are part of life – but meaningful work takes so much energy and time, it is really important to find something you love.'

advice regarding one's strengths, weaknesses, and opportunities that play to one's strengths is essential.

### Can you share with us one of the important moments in your career as a woman in these fields?

When I look back over my 40+ year career, there are many, of the Internet, a team that I led from the USGS was finally many important moments, and interestingly I may not have successful in advocating to the Department of Interior, the known at the time how important they were. One such mo- White House, and Congress that the policy of selling Landsat ment occurred when I was a hydrologist who had just moved scenes should be abandoned. This action has resulted in orfrom Denver, Colorado to Boston, Massachusetts with the ders of magnitude more imagery being downloaded daily (53 USGS. Shortly after the move to Boston, there was a big scenes to 5700 scenes daily), resulting in annual global ecoflood. Now, my experience in Colorado was that during ex- nomic benefits of \$2.1 Billion – far, far exceeding the revetreme weather conditions everyone - not just the specific nues that were collected from selling the data. The second technical experts -- are called to duty. When I went to the action was during my tenure as Director of the Group on operations chief to inform him that I was available, I was told Earth Observations (GEO). When I joined the Secretariat, we they needed streamgagers, not note takers. Without hesitat- had almost 90 Members and 75 Partner Organizations. Upon ing, I responded that I would do any job that needed to be my retirement, we had grown in membership to 105 Coundone. I didn't realize it at the time, but that response caught tries, and 115 Partner Organizations. I am particularly proud him enough off-guard that he actually started looking at fe- of this growth because in order to ensure that Earth observamale hydrologists differently. That exchange occurred 40 tions from around the world are sustained, coordinated, and years ago, and it can be very disheartening that we still need integrated, we need all countries and partner organizations to to do more to ensure women are treated equally in the sci- join forces to reach this goal. These are just two examples of ence and engineering fields. What's important is that no ac- how women are contributing to the overall development and tion is too small to help speed this transformation.

### You have led several organizations such as UN GEO, the Space Programme of and the World Meteorological Organization to name a few. What made you decide to take on the leadership roles?

About fifteen years into my career, I realized that I needed to choose between a more technical, research-oriented track, or one of science management and administration. I chose the latter. I took, and continue to take, extreme pleasure in seeing The best advice that I can offer to any young person, and parand supporting the accomplishments of others. In many ways, ticularly to young women, is to find work that you love. The it is like living vicariously through others' accomplishments, quotation by Harvey MacKay to: "Find something you love to and yet realizing that I had some small role to play in support- do, and you'll never have to work a day in your life" has cering them and their journeys. Teamwork is an absolutely es- tainly rung true for me. That is not to say that every day will sential part of organizational performance, and I liked the in- be equally rewarding, or that there will be no frustrations or tricacies of pulling high-performance teams together. Having setbacks – all of which are part of life – but meaningful work said that, I do think that leadership can be exerted from any- takes so much energy and time, it is really important to find where within an organization - not just the top. So, each of us, something you love. regardless of our position, have a responsibility to do the very best we can do to advance the goals and objectives of our re-

spective organizations. If those goals and objectives are aligned with one's personal goals and objectives, it is indeed, a powerful equation.

### Can you provide us with some of your career's highlights? How do you think women leaders contribute in the overall development and progress of geospatial information?

Looking back over my career, there are a couple actions I would like to highlight. First, the work that went into changing the data policy for the Landsat series of satellites to one of broad, open release of the data in the public domain. As you might imagine there have been many people working on this issue for many years. In the mid-2000s, buoyed by the growth progress of geospatial information. For me, there is no limit to human potential, and if we can make all data in, on, and around the Earth collected at taxpayer expense and available at no additional cost to the user, there is no end to what can be achieved.

### What is your advice for the young women aspiring to pursue a career in science and engineering as well as become leaders?

### FORESIGHT

### XXIV<sup>th</sup> ISPRS CONGRESS IN 2020

## NICE, FRANCE

14th - 20th June, 2020

Host : Société Française de Photogrammétrie et Télédétection (SFPT)

Congress Director : Nicolas Paparoditis Institut national de l'information géographique et forestière (IGN)

### www.isprs2020-nice.com



Call for abstracts & full papers: technical sessions and young investigators Call for Tutorials and Theme Sessions

> 2 SEPTEMBER 2019 Registration ( very early bird » opens

30 SEPTEMBER 2019 Deadline for « very early bird » Registrations

**1 OCTOBER 2019** Deadline for Theme Sessions and Tutorials

15 NOVEMBER 2019 Notification of authors: Theme Sessions and Tutorials 3 FEBRUARY 2020

Deadline for Abstracts & full papers: technical sessions and young investigators

I MARCH 2020 Deadline for Abstracts & full papers: technical sessions and young investigators

30 MARCH 2020 Notification of authors for full papers: technical sessions, young investigators, technical sessions

31 MARCH 2020 Deadline for « early bird » registrations Deadline for registration payment for papers to be included in proceedings

> **13 APRIL 2020** Deadline for camera ready papers

> > 4 MAY 2020 Final program release 1 JUNE 2020

Deadline for « regular » registrations



Imaging today Foreseeing tomorrow

### AGRC2019-ISPRS Summer School 2019

### "Geomatics for Development"

The Department of Geomatics and Land Management at Makerere University in Kampala, Uganda will be hosting the 5th Advances in Geomatics Research Conference (AGRC2019) from the 1st to the 2nd of August 2019. As part of the conference series, we are proud to announce that we shall be hosting an ISPRS sponsored Summer School on 'Introduction to Radar Remote Sensing' from the 24th - 26th July 2019 at Makerere University. This Summer School will be facilitated by Prof. Dr. Mahdi Motagh of the Institute of Photogrammetry and GeoInformation, Leibniz University in Hannova, Germany. For more information, contact the conference organizers agrc@cedat.mak.ac.ug



### FORESIGHT

## ISPRS WG IV/1, WG V/5 Student Consortium Summer School



Welcome to ISPRS WG IV/1, WG V/5, Student Consortium Summer School: Geospatial technologies for natural environment management and monitoring.

It is our great pleasure to invite students and young researchers to attend the ISPRS Summer School at Wroclaw University of Science and Technology in Poland, 26-30 August 2019. The event will be organised jointly by Wroclaw University of Science and Technology, Forest Research Institute and ISPRS, in particular by two ISPRS working groups IV/1 and V/5 with support of Student Consortium.

During the ISPRS Summer School students and young researchers will be able to extend their knowledge in the field of geospatial technologies and learn about advancements in the field of natural environment management and monitoring. Workshops and educational trips will be focused on environmental issues related to industrial activities, such as mining, as well as forestry and preservation of natural resources. It is also an excellent opportunity to meet people from all over the world, who share a passion for research. We also prepared a rich social programme, which will give you more time for discussions, to share your experience and exchange ideas.

This year the ISPRS Summer School will be organised in a beautiful city of Wroclaw located in western Poland. It is an academic city with many universities and full of students. Because of that it is a vibrant and international place, where everybody is welcome.

In order to give an opportunity to polish professional and academic skills, we want to encourage all participants to submit a research paper to a conference organised during the event. Your work will be published in a conference book and presented during oral and poster sessions.

Please register at our website: isprs.pwr.edu.pl and join us in Wroclaw in August 2019!

<sup>-</sup> Pawel Boguslawski, ISPRS Summer School Chairman

### IN THE HORIZON



### PhD fellowships and scholarships

- Six PhD scholarships in Environmental and Infrastructure Engineering at Politecnico di Milano, Italy
   Deadline: Not Specified <u>http://www.dica.polimi.it/en/</u> <u>dottorato/dot-amb/</u>
- PhD position in remote sensing at Forschungszentrum JülichInstitute of Bio- and Geosciences (IBG) Jülich, Germany
   Deadline: 31st May 2019 <u>http://www.fz-juelich.de/</u> <u>SharedDocs/Stellenangebote/</u> <u>common/dna/2019D-125-EN-IBG-</u> 3.html?nn=718260
- PhD position in simulation sciences at Forschungszentrum JülichInstitute of Bio- and Geosciences (IBG) Jülich, Germany

Deadline: 30th April 2019 http://www.fz-juelich.de/ SharedDocs/Stellenangebote/ \_common/dna/2019D-121-EN-IBG-3.html?nn=718260

 PhD positions in the Earth@lternatives project on sustainable land and water use for food and energy at University of Twente, The Netherlands
 Deadline: Until filled (Start date 1st September 2019) <u>https://www.utwente.nl/en/</u> organization/careers/!/915549/phd -positions-in-the-earthIternativesproject-on-sustainable-land-andwater-use-for-food-and-energy

 PhD in Earth System-Modelling at the Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences, Germany Deadline: 13th May 2019 <u>https://gfz-potsdam.concludis.de/</u> prj/shw/ <u>b6cda17abb967ed28ec9610137a</u> a45f7 0/2338/PhD position.htm?

lang=en\_GB

 PhD candidate UAV/drones to support first responders, using advanced computer vision and machine learning at University of Twente, The Netherlands
 Deadline: 1st May 2019 <u>https://www.utwente.nl/en/</u> organization/careers/!/903245/phd -candidate-uavdrones-to-supportfirst-responders-using-advancedcomputer-vision-and-machinelearning

### **MSc scholarships and fellowships**

- Masters in Integrated Water Management at the International Water Center in Australia
   Deadline: 30th September 2019 https://watercentre.org/master-of -integrated-water-management/
- Scholarships for master programmes (ICP) in Belgium

Deadline: Depends on program <u>https://www.vliruos.be/en/</u> <u>scholarships/</u> <u>scholarships in flanders/</u> <u>scholarships for master programme</u> <u>s (icp)/114</u>

#### Postdoc fellowships

 Postdoc or research scientist in atmospheric chemistry observation and modelling at Nanjing University of Information Science & Technology, Nanjing, China

> Deadline: Until filled <u>https://www.egu.eu/jobs/2356/</u> <u>postdoc-or-research-scientist-</u> <u>atmospheric-chemistry-observation-</u> <u>and-modeling/</u>

- Postdoc in "Remote sensing of ecophysiological traits from Unmanned Aerial Systems" at Technical University if Denmark Deadline: 20th May 2019 <u>https://www.egu.eu/jobs/2347/</u> <u>postdoc-in-remote-sensing-of-</u> <u>ecophysiological-traits-from-</u> <u>unmanned-aerial-systems/</u>
- Postdoctoral Position in Seismology at Department of Mathematics and Geosciences -University of Trieste, Italy
- Deadline: 2nd May 2019
  <u>http://web.units.it/node/36606/</u>
  <u>assegno/pub</u>

### IN THE HORIZON

## **UPCOMING EVENTS 2019**

17-18 Apr 2019

### ISPRS WG V/8 & V/1 Workshop on Open Source and Multi-level Education for Geospatial Technology 2019

Site: Taipei, Taiwan Contact: Chao-Hung Lin , Anjana Vyas linhung@mail.ncku.edu.tw; anjanavyas@yahoo.com Website: http://os2018.geomatics.ncku.edu.tw/

### 17-19 Apr 2019

## ISRS 2019 international Symposium on Remote Sensing

Site: Taipei, Taiwan Contact: isrs2019@csrsr.ncu.edu.tw Website: https://isrs.csrsr.ncu.edu.tw/

### 25-27 Apr 2019

### TUFUAB 2019-Aksaray Turkish National Society for Photogrammetry and Remote Sensing X.

Site: Aksaray, Turkey Contact: tufuab2019@gmail.com Website: http://tufuab2019.aksaray.edu.tr/

### 🔲 30 Apr 2019

## Journée du bicentenaire Aimé Laussedat (1819-1907)

Site: Paris, FRANCE Contact: Laurent Polidori +33 6 7818 8698 laurent.polidori@cesbio.cnes.fr Website: http://www.sfpt.fr/

### 🗖 02 May 2019

ISPRS TC II, WG II/9

### Underwater 3D Recording and Modeling

Site: Limassol, CYPRUS Contact: Dimitrios, Skarlatos Website: http://3d-underwater.cut.ac.cy/

### 03-05 May 2019

### GISTAM 2019 5th International Conference on Geographical Information Systems Theory, Application and Management

Site: Heraklion, Crete, GREECE Contact: gistam.secretariat@insticc.org Website: http://www.gistam.org/

### 06-08 May 2019

### ISPRS WG I/7, WG I/2, WG I/6, WG II/3 11TH International Symposium on Mobile Mapping Technology and Summer School on Mobile Mapping

Site: Schenzhen, CHINA Contact: Naser El-Sheimy +44(0)1453 836363 elsheimy@ucalgary.ca Website: http://www.mmt2019.com/



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### 08-10 May 2019

### ISPRS WG II/8, WG III/5, WG V/1 GeoRes2019 2nd International Conference Site: Milan, ITALY Contact: Raffaella Brumana + 39 3403940893 raffaella.brumana@polimi.it

Website: http://www.geores19.polimi.it/

### 13-15 May 2019

### ISPRS WG II/10 & WG II/5 International Workshop on "Photogrammetric and Computer Vision techniques for video surveillance, biometrics and biomedicine" Site: Moscow, RUSSIA

Contact: Vladimir A. Knyaz +7 499 157 3127 +7 499 943 8605knyaz@gosniias.ru Website: http://technicalvision.ru/ISPRS/PSBB19/

### 15-17 May 2019

ISPRS WG III/5 JISDM 4th Joint International Symposium on Deformation Monitoring and Analysis

Site: Athens, GREECE Contact: Vassilis Gikas+30 210772 3566 + 30 210772 2728 vgikas@central.ntua.gr Website: http://www.jisdm2019.survey.ntua.gr/

IN THE HORIZON

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### 21-22 May 2019

### **GEO Business**

Site: London, UK Contact: +44(0)1453 836363 info@GeoBusinessShow.com Website: http://www.geobusinessshow.com/

### 🗖 22-24 May 2019 **ISPRS JURSE 2019**

Site: Vannes, France Contact: Thomas Corpetti +33 2 99 14 18 77 Sébastien Lefèvre +33 2 99 01 72 66 contact@jurse2019.org Website: http://jurse2019.org/

### 28-31 May 2019

### ISPRS WG II/1 & WG II//2 PhotoGA 2019 and CRV Workshop

Site: Kingston, CANADA Contact: Mozhdeh Shahbazi +1-403-210-7710 mozhdeh.shahbazi@ucalgary.ca Website: http://www2.isprs.org/commissions/comm2/wg1/ PhotoGA19.html

## UPCOMING EVENTS 2019

22-24 May 2019

### **EURASIAN RISK 2019** Site: Baku, AZERBAIJAN

Contact: Vugar Aliyev secretary@eurasianrisk2019.az Website: http://os2018.geomatics.ncku.edu.tw/

### 04-06 Jun 2019 ISPRS WG IV/7 & WG IV/1 Workshop on Modeling and Managing **Geospatial Data**

Site: Fredericton, NB, CANADA Contact: Emmanuel Stefanakis +1 506 4535137 +1 506 4534943 estef@unb.ca Website: http://www.sfpt.fr/

### 10-14 Jun 2019

### **ISPRS Geospatial Week 2019**

Site: Enschede, THE NETHERLANDS Contact: George Vosselman +31 53 4874 358 gsw2019@utwente.nl Website: https://www.gsw2019.org/

### 16-17 Jun 2019

ISPRS WG II/1 & WG II/6 EARTHVISION 2019 **IEEE/ISPRS Workshop. Large Scale Computer** Vision for Remote Sensing Imagery

Site: Long Beach, CA, USA Contact: Ronny Hänsch r.haensch@tu-berlin.de Website: https://www.grss-ieee.org/earthvision2019/

### ISPRS TC II PCV 19

Photogrammetric Computer Vision 2019 Site: Long Beach, CA, USA Contact: Andrea Fusiello andrea.fusiello@uniud.it

## Website: https://sites.google.com/view/pcv19/home

### ISPRS WG II/10, WG III/10 & WG III/5 Innsbruck Summer School of Alpine Research 2019

Site: Obergurgl, AUSTRIA Contact: Martin Rutzinger +43-512-507-49480 +43-512-507-49499 martin.rutzinger@oeaw.ac.at Website: https://www.uibk.ac.at/geographie/ summerschool/2019/

### 🗖 24-26 Jun 2019 ICUI 2019 2nd International Conference on Urban Informatics

Site: Hong Kong, HONG KONG Contact: Raffaella Brumana + 39 3403940893 raffaella.brumana@polimi.it Website: http://www.geores19.polimi.it/

### ISPRS WG I/2 EOEC-GiT4NDM 2019

Site: Chengdu, CHINA Contact: Jonathan Li junli@uwaterloo.ca Website: http://eoec2019.csp.escience.cn/dct/page/1 We would like to extend our sincerest gratitude to all the beautiful and brilliant women who gave us their time for preparing the interviews and answering the interviews - for bravely sharing with us their valuable experiences so they can empower more women in our profession.

We are also thanking all the women out there, not only in remote sensing and geospatial information. For every woman representing an advocacy, breaking barriers and becoming vulnerable, we thank you for your courage and exceptional capabilities!

Cheers to empowerment and diversity!





Please visit our SC web page **sc.isprs.org** where you will find more information about Student Consortium, our previous Newsletter issues, SC activities, photo galleries from previous Summer Schools, interesting links etc.

