The Royal Society OF VICTORIA

Promoting science since 1854

PATRON: The Hon Linda Dessau AC
Governor of Victoria

PRESIDENT: Mr David Zerman

This Month's Events…

21st September: Professor Mark S. Boyce
"Predator-Prey Systems: The Wolves in Yellowstone"

28th September: Dr Kaye Morgan
"Playing with Light: Dynamic Soft-tissue X-ray Imaging at the Synchrotron"
The 2017 Phillip Law Postdoctoral Award Lecture

September 2017 Newsletter

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October Advance Notice:

12th October: Dr Thomas Oxley
"Neural Interfaces: a New World of Brain Augmentation"

26th October: Professor Paul Sunnucks
"Understanding Persistence & Adaptation of Wildlife in the Genomic Age"

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Melbourne Victoria 3000
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rsv.org.au

September Meetings & Events

Predator-Prey Systems: the Wolves in Yellowstone

Thursday, 21st September 2017 at 7:00pm.

Speaker: Professor Mark Boyce

The Alberta Conservation Association Chair in Fisheries & Wildlife
The University of Alberta, Canada

Predation is increasingly recognized as an ecological process that structures natural communities, and has been targeted as an important focus for conservation, notably informing the "rewilding" movement for reintroducing apex and meso-predators to natural environments across the world, involving wolves, cougars, lynx, bears and dingos, among many others. Yet, others have argued that the extent and magnitude of trophic cascades has been overstated and that few clear examples exist in terrestrial ecosystems, especially for behaviourally-driven trophic cascades.

A trophic cascade is an ecological phenomenon triggered by the addition or removal of top predators and the reciprocal changes in the relative populations of predator and prey through a food chain, with often dramatic changes in ecosystem structure and nutrient cycling.

Professor Mark Boyce will review the details of this debate with a particular focus on the iconic wolf recovery in Yellowstone National Park and conclude that, as predicted by theory, we see spatial and temporal variability in predator-prey systems that likewise generate spatial and temporal variability in the expression of trophic cascades. Outside protected areas in western North America, however, humans have a dominant influence that overwhelms trophic cascades and can result in bottom-up influences on community structure and function.

About the Speaker:

Professor Mark S. Boyce received his Bachelor of Science from Iowa State, Master of Science from University of Alaska, and MPhil and PhD degrees from Yale University. He was a NATO postdoctoral fellow at Oxford University. He is Professor of Ecology and holds the Alberta Conservation Association Chair in Fisheries and Wildlife at the University of Alberta.

His research specialty is the population ecology of vertebrates and he currently supervises 8 graduate students and postdocs. He is a Fellow of the Royal Society of Canada and was awarded the Mirosław Romanowski Medal by the Society in 2016 for applications of science to solve environmental problems. In 2017 he was awarded the C. Hart Merriam Award by the American Society of Mammalogists.

A free event, places limited, bookings essential! Register online now at **https://rsv.org.au/events/wolves-yellowstone/** , call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au.

September Meetings & Events

Science Postgraduate Studies and Beyond – What's Ahead?

An Afternoon Panel Discussion for Tertiary Science Students

Tuesday, 26th September 2017 at 3:00pm

For Science, Technology, Engineering and Mathematics (STEM) students looking ahead to Honours, Masters or Doctoral studies, it's important to hear from others who've already "taken the plunge" and scouted ahead for the hazards and opportunities that lie in wait. STEM skills are sought across many employment sectors, from academia to industry to government to community, so it's hard to be certain where your studies will take you.

Come spend a relaxed afternoon at the Royal Society of Victoria in conversation with three recent PhD graduates and graduands to hear about their journeys, ask your burning questions and discuss some strategies for approaching your future in science. **For RSV members and members of Young Scientists of Australia (Melbourne) only please.**

About the Panellists:

Dr Catherine de Burgh-Day did her BSc, Masters and PhD all at the University of Melbourne. She went into her BSc with the intention of majoring in meteorology, but very quickly got distracted by the wonders of astrophysics. She went on to complete a Masters and then a PhD in astrophysics, studying weak gravitational lensing. As a final year PhD student, she won the Young Scientist Research Prize for the Physical Sciences from the Royal Society of Victoria in 2015.

Things have come full circle and she now works at the Bureau of Meteorology, where she has been a software developer on the Bureau's super computer systems, currently in the research department developing applications for seasonal forecasting of sea surface temperatures around New Zealand for aquaculture industries. Catherine likes to keep her eggs in many baskets, and firmly believes in always keeping your options open - after all, who knows what the universe might throw your way?

Viktor Perunicic is a physicist at the Australian Research Council Centre of Excellence for Quantum Computation and Communication Technology (CQC2T) at the University of Melbourne, and a Councillor of the Royal Society of Victoria. He develops techniques for in situ imaging of single proteins and will hit why this is important for your own health. During his PhD, he developed and patented a blueprint for miniaturising MRI machines onto a chip using Quantum Computing technology.

Viktor will be drawing on his broad experience to share pragmatic insights to: the professional and personal benefits to be gained from postgraduate training in scientific research; the pros and cons of working as an early career researcher in Australia at the present moment and near future, and; the character traits researchers rely on and the deeper motivations that drive scientists' work.

Nicole Lake is passionate about research that helps us understand how genetics influences health and disease. She is currently completing the final year of her PhD with the Mitochondrial Research Group at the Murdoch Children's Research Institute. Her PhD has focused on using sequencing technologies to identify the genetic causes of mitochondrial disease. Prior to this, Nicole completed a BSc from the University of Melbourne and the University of Edinburgh, and a MSc (Genetics) degree from the University of Melbourne. Her Master's research project investigated how our genes influence our good cholesterol levels, which was completed in the Genomics and Systems Biology laboratory at the Baker Heart and Diabetes Institute. Nicole is also a member of the community organisation Rotary International, and is a past President of the Rotary Club of Melbourne Park.

Eventbrite

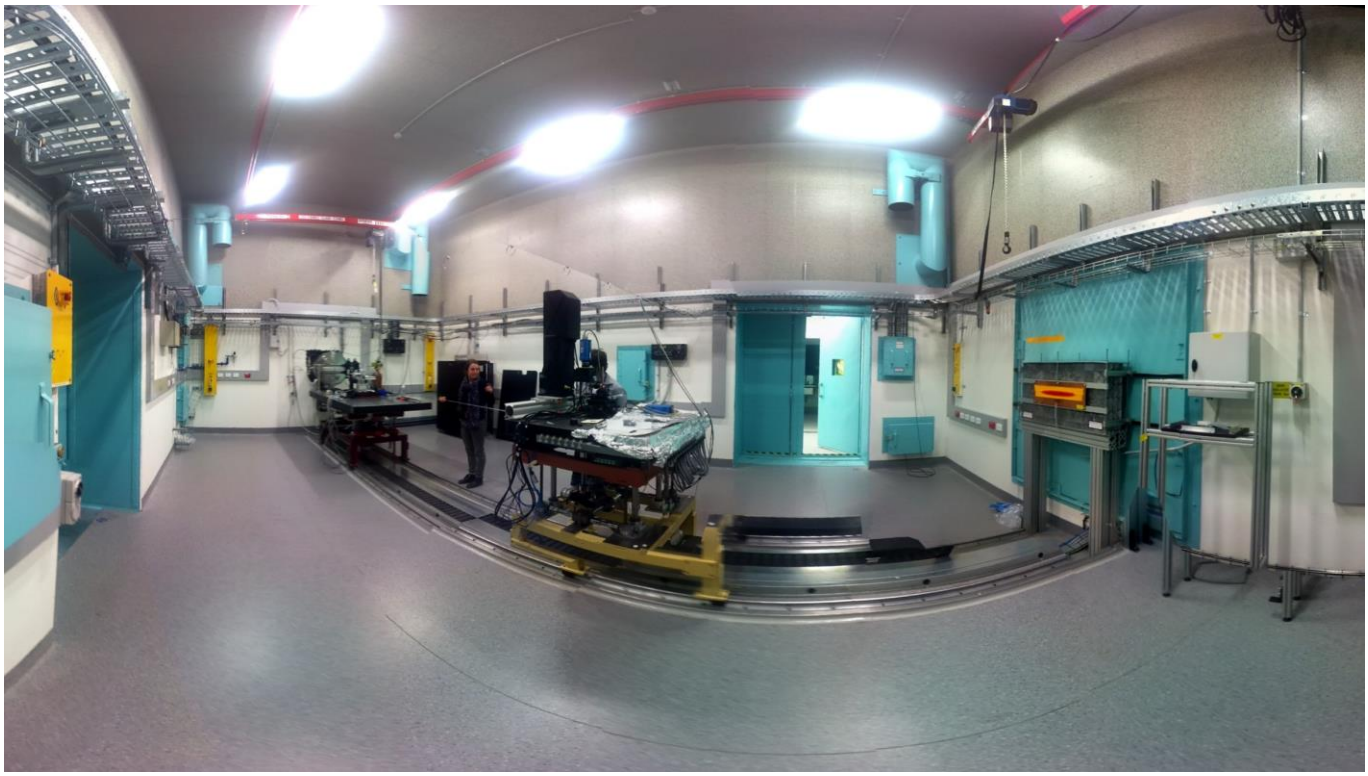
Register online now at **https://rsv.org.au/events/postgrad-whats-ahead/**, call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au

September Meetings & Events

Playing with Light: Dynamic Soft-Tissue X-Ray Imaging at the Synchrotron

The 2017 Phillip Law Postdoctoral Award Lecture

Thursday, 28th September 2017 at 7:00pm.

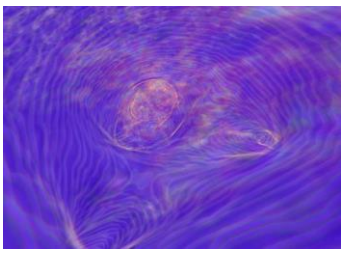


Speaker: Dr Kaye Morgan

VESKI Postgraduate Research Fellow, School of Physics, Monash University
Chair of Biomedical Physics, Technische Universität München, Germany

Every day we observe visible light creating interesting phase effects, like the bright lines dancing on the bottom of a swimming pool or a pair of eyeglasses sitting on a newspaper and distorting the print. These same kind of effects can be observed with x-ray light, and if we understand how x-rays behave, we can exploit these phase effects to capture sensitive and quantitative x-ray images.

Join Dr Kaye Morgan, who will describe her work on new 'phase contrast' x-ray imaging techniques that can capture images of not only bone, but also soft tissue structures. These techniques are in development at research facilities like the Australian Synchrotron, where it is possible to capture high-speed movies of soft tissue dynamics. The talk will conclude by looking at applications of Dr Morgan's imaging methods in advancing biomedical research and the potential for diagnostic imaging.



About the Speaker:

Dr Kaye Morgan is the 2017 recipient of the Royal Society of Victoria's Phillip Law Postdoctoral Award for the Physical Sciences, awarded to an outstanding early-career researcher and doctoral graduate from a Victorian institution. She is a VESKI Postdoctoral Research Fellow with the School of Physics at Monash University and the Chair of Biomedical Physics with the Technische Universität München in Germany. In addition to her research into soft -tissue multi-modal x-ray imaging techniques, Kaye also teaches a Masters course in image processing for physics.

A free event, places limited, bookings essential! Register online now at **https://rsv.org.au/events/playing-with-light/** , call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au

Nominations for RSV Membership

Nominations for membership of the Society have been received on behalf of:

Dr Christy Anna **HIPSLEY**, Research Fellow
Ms Mary **PIDDINGTON**, Retiree
A/Professor Wendy **WRIGHT**, Biologist & Ecologist
Dr Renee **BEALE**, Arts Curator & Science Communicator
Mr Siddharth **VERMA**, Business Owner
Mr Stephen **SPAIN**, Academic

Unless Members request a ballot, they will be considered for election by Council and if elected, will be announced at the Ordinary Meeting of the Royal Society of Victoria to be held on 12th October.

Recently elected members who have not yet signed the Society's membership book are invited to attend the 28th September meeting to be formally welcomed as members. **Please inform the office if you plan to attend, so we can prepare your membership certificate for collection.**

Young Scientist Research Prizes – 2017 Competition Results

A tough crowd: presenting to the Royal Society of Victoria

This year's competition was one of the toughest our judges have had to assess in recent memory, with eight outstanding early-career scientists presenting their work with consistent excellence. As finalists from a very competitive applicant pool of 41 final year PhDs from across Victorian research institutions, our newest members of the Royal Society of Victoria had already demonstrated the excellence of their scientific research before they even walked in the front door; the final task before them was to communicate the methods and significance of their complex work to a general audience of scientists and science enthusiasts in a clear, concise and engaging presentation of no more than ten minutes!

Ten short minutes to present three to four years of intense scientific inquiry to a general audience, while remaining true to the science, takes many hours of careful thought and diligent preparation, and all of our finalists demonstrated just how much they had invested in transmitting their research effectively to the "interested yet uninitiated!" We convey our sincere thanks to all for their commendable efforts, particularly as they face the final months of their doctoral studies.

Ultimately, our competition must acknowledge those who draw ahead of the pack on the grounds of effective communication, robust science, capacity to answer questions through audience discussion and the significance of their research. The results are listed below in each category, with warm congratulations to all our winners ($1000) and runners-up ($250).

Earth Sciences:

Alexander Norton with RSV President David Zerman

Winner: Alexander Norton, School of Earth Sciences, The University of Melbourne

"Observing photosynthesis from space: A novel technique using plant chlorophyll fluorescence measurements and a carbon cycle model."

Nicolas Molnar with David Zerman

Runner Up: Nicolas Molnar, School of Earth, Atmosphere, & Environment, Monash University

"The unzipping of continents."

Physical Sciences:

Guoping Hu with David Zerman

Winner: Guoping Hu, Department of Chemical Engineering, The University of Melbourne

"Novel promoters for carbon dioxide absorption in potassium carbonate solutions."

Justine Corso with David Zerman

Runner Up: Justine Corso, School of Physics, The University of Melbourne

"Damage and orientation in single molecule imaging using x-ray free-electron lasers."

Biological (non-human) Sciences:

Perran Ross with David Zerman

Winner: Perran Ross, School of BioSciences, The University of Melbourne

"Environmental impacts on the use of Wolbachia for arbovirus control."

Bryant Gagliardi with David Zerman

Runner Up: Bryant Gagliardi, School of BioSciences, The University of Melbourne

"Differentiating pollutant-induced effects from non-contaminant stress responses in aquatic midges (Diptera: Chironomidae)."

Biomedical & Health Sciences:

Sarah Larcome with David Zerman

Winner: Sarah Larcombe, Department of Microbiology & the Biomedicine Discovery Institute, Monash University

"New insights into the pathogenesis of diverse bacterial species in non-C. difficile antibiotic-associated diarrhoea."

Joshua Newson with David Zerman

Runner Up: Joshua Newson, Department of Microbiology & Immunology and the Doherty Institute for Infection & Immunity

"Salmonella effector proteins interrupt host cell death signalling."

From left: RSV Science Program Chair Dr Kevin Orrman-Rossiter, Guoping Hu, Nicolas Molnar, Bryant Gagliardi, Perran Ross, Justine Corso, Joshua Newson, Sarah Larcombe, RSV President David Zerman, Alexander Norton, RSV CEO Mike Flattley

Congratulations once again to all our wonderful finalists, and for the many friends, family members, peers and PhD supervisors who attended in support. It was a terrific night, exploring a small yet vigorous sample of the remarkable work undertaken by the latest generation of Victoria's outstanding scientists.

Thanks also to our hard-working assessors and judges over the course of this year's competition; Dr Mary Tolcos, Dr Stacey Ellery, Professor Richard Harding, Professor David Walker, Dr Kevin Orrman-Rossiter, Viktor Perunicic, Dr Tom Beer, Dr Bill Birch, Dr Tom Darragh, Fons Vandenberg, A/Professor Robert Day, Professor Andrew Bennett, Dr Mark Green and Dr Eric Treml.

The Prizes are supported by the RSV Science Foundation, commemorating contributions from the families of the former RSV Presidents Neil Archbold and Edmund Gill, and supported in 2017 by the generosity of Max and Margaret Richards.

The Judging Panel, from left: Dr Bill Birch, Dr Stacey Ellery, David Zerman, A/Prof Robert Day, Dr Kevin Orrman-Rossiter, Nicola Williams, Dr Peter Baines, Prof David Walker, Dr Mary Tolcos

Let's Torque

The Royal Society of Victoria is proud to support a new public speaking comptetition for undergraduate science students in Melbourne to present on a Science, Technology, Engineering or Mathematics (STEM) concept, and explain how it will benefit Australa economically, environmentally or socially. Let's Torque has been organised by a dynamic group of students from the Advanced Science – Global Challenges program at Monash University.

With entries submitted and preparatory workshops now completed with expert coaching from Nous Group, September is semi-finals month, with all applicants competing over three events to enter the Grand Final at the Society on 5 October. Entrants will be assessed by the judges on their speaking skills, ability to explain their STEM concept and its application to a specific solution, the feasibility of their intervention and the scope of its potential impact – all combined with that all-important "pizzaz."

Grand Final

Thursday, 5 October 2017 at 6:00pm at the Royal Society of Victoria

10 finalists will come together for the Let's Torque Grand Final, showcasing their STEM communication skills and sharing the exciting future of STEM in Australia with friends, family and the community. The winner and runner up will each receive a cash prize, a year's membership of the Royal Society of Victoria, and a two year subscription to Cosmos Magazine.

Register now to attend, see these fantastic presentations and network with the science community over tasty snacks!

trybooking **Tickets $5, places limited, bookings essential! Register online** now at https://www.trybooking.com/book/event?eid=308182

The Migrant Science Communication Project

Our Migrant Science Communication project participants continue to roll their presentations out to Victorian schools through Cultural Infusion's incursion program! This month we feature Tunisian-born hydro-biologist, Imen Saidi.

"How to Vanish like a Zebra"

Imen immigrated to Australia from Tunisia in 2011 to start a family with Chokri, whom she had met through arrangement between her old teacher, Madame Noura, and her father. A speaker of Arabic and French, she searched for work in Australia to apply her skills in biology and geology, but eventually was pleased to secure work with Myer in the city until the birth of her first child in

2012. Her second child was born in 2015, and in-between Imen encountered one of the curses of the qualified migrant. She couldn't get a job, because she didn't have local experience. She decided to return to study and encountered the second curse; the IELTS test, which is used to identify someone's level of proficiency in English. She would need a score of 8.5 out of 9 in her third language!

'"I love science- I love it. But I couldn't find a way to get a job about science. I found out about the [Migrant Science Communication] program on Facebook, my friend shared it. I looked at it and I put a lot of hope on it. I thought 'This is what I am looking for, it's the right time…'"'

You can read all about Imen online at http://culturalinfusion.org.au/how-to-vanish-like-a-zebra/

Imen Saidi presents "Camouflage" at Collingwood College

Meanwhile, schools can book Imen's wonderful new science show "Camouflage" for years 1 to 7 available online from Cultural Infusion at http://culturalinfusion.org.au/programs/camouflage/ .

Dr Kaye Morgan Wins 2017 Phillip Law Postdoctoral Award

We are delighted to announce Dr Kaye Susannah Morgan (pictured left) is this year's recipient of the prestigious Phillip Law Postdoctoral Award for the Physical Sciences. The Award is given to an outstanding early-career researcher within seven years of their doctoral degree being conferred by a Victorian research institution.

Dr Morgan is currently a VESKI Postdoctoral Research Fellow with the School of Physics at her alma mater, Monash University, and is the Chair of Biomedical Physics with the Technische Universität München in Germany. In addition to her remarkable research into soft-tissue, multi-modal, x-ray imaging techniques, Kaye also teaches a Masters course in image processing for physics.

After completing her physics PhD at Monash University in 2011, Kaye secured an NHMRC grant to continue at Monash with her research into x-ray imaging of biological interfaces as a post-doctorate researcher, later securing a DECRA Research Fellowship to specifically interrogate the application of her research to Cystic Fibrosis treatments.

RSV Science Program Chair, Dr Kevin Orrman-Rossiter extended thanks to all 2017 applicants, remarking that this year's pool was "particularly competitive."

"It's wonderful to see the amazing, globally-significant work that Victorian doctoral graduates are undertaking," he said. "Dr Morgan has clearly distinguished herself in this field, not only for her strong record of collaboration, publication and conference presentation, but also her vigorous commitment to supervising the next generation of PhD students and teaching into a physics Masters course. All this, while her research is being directly translated into medical applications and innovations in technology used by a global research community! She is an outstanding Victorian researcher, one of our very brightest, and we should all be very proud of everything she's achieving."

In addition to a formidable collection of grants, awards and fellowships that acknowledge her achievements, leadership and further potential, Kaye has published extensively both as first and joint author, has established a vibrant international network of research collaborators, has influenced the improvement of synchrotron beamline designs globally and, significantly, is now translating her 'phase contrast' imaging work with a synchrotron to more compact laboratory and hospital-compatible settings to enable medical researchers and radiologists to utilise this next-generation x-ray source for research and clinical diagnostic purposes.

Congratulations to Dr Kaye Morgan, who will receive her award and present a public lecture at the Society on 28 September titled "Playing with Light: Dynamic Soft-Tissue X-Ray Imaging at the Synchrotron." Please register to join us, and help celebrate Kaye's wonderful achievements.

This award was made possible from the generous bequest to the Society from the estate of the late Dr Phillip Garth Law AC, formerly the Director of the Australian Antarctic Division and a President of the Royal Society of Victoria.