

SMBE Regional Meeting on the Role of the Genome in Biological Invasion

Hamilton, New Zealand; November 6th to 9th 2022

Final report submitted to the Society for Molecular Biology and Evolution

Angela McGaughran and Manpreet Dhami, on behalf of the organising committee

Organising committee

Dr Angela McGaughran, University of Waikato
Dr Manpreet Dhami, Manaaki Whenua Landcare Research
Dr Eli Parvizi, University of Waikato
Dr Amy Vaughan, Manaaki Whenua Landcare Research

Conference overview

The SMBE Regional meeting on the Role of the Genome in Biological Invasion (<https://www.invasomics.com/conferences>) was held in Hamilton, New Zealand from 6th to 9th November 2022. There were 34 participants on site and 24 attendees online.

The meeting was organised by a group of four female researchers - two mid-career and two postdoctoral fellows. Attendance was very diverse and representative of the field, with people at different career stages, from both academia and industry, and from different minority groups. We also had attendance from regional council and government bodies, for whom our research is highly relevant and likely to create real-world impact. With our virtual attendees, we had locations in the US, South America, Europe, Hawaii, and Australia represented. To further consider equity, we carefully selected our keynote, plenary, and other speakers to include gender and career stage diversity and adapted the programme to best work for virtual presentations coming from different time zones. We catered to various dietary requirements for the in-person attendees, provided travel awards to seven attendees, and kept overall attendance costs very low. We recorded all of our presentations and are currently working towards making them publicly available on the conference website.

We had an amazing agenda, with a total of 23 presentations - including two plenary presentations (Assoc Prof Lee Rollins and Prof Neil Gemmell) and four presentations from keynote speakers (Assoc Scientist Carolyn Tepolt, Assist Prof Kathryn Turner, Prof Dianne Gleeson, Assoc Prof Rob Calautti). We also had a full day dedicated to open discussion around collaboration and funding opportunities, during which we brainstormed plans for a joint review paper that we are planning to submit to *Genome Biology and Evolution* in the new year.

The main aim of our conference was to focus understanding on the role of the genome in biological invasion. We encouraged and prioritised talks from

attendees whose research targeted the genomics of invasion for a diverse variety of species (especially non-model organisms) and geographic areas, and where there is an emerging understanding of evolutionary processes facilitating local/global range expansion. During the conference, we also launched the 'Invasomics Hub' - a global network for bringing together researchers in invasion genomics.

Although many researchers are working on diverse invasive systems around the world, there is little connection between them and there had never been a meeting solely focused on invasion genomics. Our meeting therefore provided an opportunity to address this gap, and it is our intention to hold future meetings (every ~2 years) - this goal will be facilitated by the Invasomics Hub and its ongoing efforts to connect invasomics researchers.

We believe our meeting had several important outcomes: (1) in launching the Invasomics Hub, we have created an ongoing network for researchers in the invasion genomics field, and we will use this to connect researchers, advertise pertinent information (conferences, new papers, grants, etc.), and try out several new initiatives (e.g. guest blog posts, invited virtual attendance to members lab meetings) over the short- and long-term; (2) our full-day workshop on collaboration opportunities will lead to group grant applications and at least one review paper; (3) we have created a definite sense of community among researchers from normally isolated disciplines, and this will certainly be the first of many invasion genomics conferences!

Budget

SMBE awarded us \$27,600 USD, and we also received sponsorship from University of Waikato, Genomics Aotearoa, and Manaaki Whenua Landcare Research (total approx ~\$54,000 NZD). Collectively, we have used these funds as follows:

Budget - actual (NZD)

Travel and accommodation (speakers/travel awards)	22,700
Catering	15,000
Venue hire	3,000
Website	1,050
Printing and merchandise	3,000
Prizes	<u>1,100</u>
TOTAL	\$45,850

From the pooled sponsorship, we have a surplus of ~\$8,000 NZD. We propose that we use these funds towards immediate and future Invasomics Hub activities. In the immediate term, we can fund publication fees for the above mentioned synthesis article and support maintenance and content creation for our Invasomics Hub website. In the longer term, we intend to use these funds to support costs for the next Invasomics conference (penciled in for 2024), particularly for supporting travel and carer grants. We are keen to hear your thoughts on how we may further utilise the remaining funds.

Conference programme



SMBE Regional Meeting on The Role of the Genome in Biological Invasion (New Zealand) Programme 6 - 9th November 2022

	SUNDAY 6th NOVEMBER
5:00PM-7:00PM	Icebreaker Event; Room: TE WHARE
	MONDAY 7th NOVEMBER
	ZOOM LINK: https://waikato.zoom.us/j/87074682984
9:00AM-9:15AM	CONFERENCE OPEN; Room: TE WHARE Ang and Manpreet
9:15AM-10:15AM	PLENARY ONE: NEIL GEMMELL; Room: TE WHARE Talk title: Genomics – A swiss army knife for biosecurity
10:15AM-10:45AM	MORNING TEA; Room: PLAYHOUSE FOYER
10:45AM-11:25AM	SESSION ONE: Global pathways / threats; Room: TE WHARE Keynote One: Rob Colautti Talk title: The value of null and neutral models in invasion genetics
11:25AM-11:40AM	Sudeeptha Yainna: The global invasion and the spread of insecticide resistance mutations in the fall armyworm (<i>Spodoptera frugiperda</i>)
11:40AM-11:55AM	Marc Rius: The reconstruction of invasion histories with genomic data in light of differing levels of anthropogenic transport
11:55AM-12:10PM	Pluto Liu: Will rafting sub-Antarctic kelp and its passengers become established in Antarctica?
12:10PM-12:25PM	Antoine Felden: Can virus-virus interactions in the parasitic mite <i>Varroa destructor</i> limit its impact on honey bees?
12:25PM-2:00PM	LUNCH; Room: PLAYHOUSE FOYER
2:00PM-2:40PM	SESSION TWO: Technologies; Room: TE WHARE Keynote Two: Di Gleeson Talk title: Operationalising eDNA applications for invasive species surveillance and detection
2:40PM-2:55PM	Paige Matheson: Genomic data is missing for many highly invasive species, restricting our preparedness for escalating incursion rates
2:55PM-3:10PM	Andrew Veale: Applied genomics for mammalian pest control in Aotearoa
3:10PM-3:25PM	Georgia Thomson-Laing: Using sedimentary eDNA to detect the presence and impact of European perch in lakes
3:25PM-3:40PM	Ellen Cottingham: Gene drives for the population management of introduced species in Australia
3:40PM-5:00PM	AFTERNOON TEA & POSTERS; Room: PLAYHOUSE FOYER

TUESDAY 8th NOVEMBER	
ZOOM LINK: https://waikato.zoom.us/j/83106888416	
9:00AM-10:00AM	PLENARY TWO: LEE ROLLINS; Room: TE WHARE Talk title: Invasive species as model systems for investigating mechanisms of rapid evolution
10:00AM-10:30AM	MORNING TEA; Room: PLAYHOUSE FOYER
10:30AM-11:10AM	SESSION THREE: Eco-evo; Room: TE WHARE Keynote Three: Carolyn Tepolt Talk title: Fine-scale selection to temperature at a putative supergene along a rapidly expanding marine invasion front
11:10AM-11:25AM	Louise Camus: Predicting invasiveness of a species with genomic data: a case study on the fruit pest <i>Drosophila suzukii</i>
11:25AM-11:40AM	Henry North: Selection and hybridization interact to shape the outcome of <i>Helicoverpa</i> invasion in Brazil
11:40AM-11:55AM	Cui Wang: Genome-wide analysis tracks the population history of a polyploid invasive plant <i>Phragmites australis</i>
11:55AM-12:10PM	Katarina Stuart: Contrasting patterns of single nucleotide polymorphisms and structural variations across multiple invasions
12:10PM-12:25PM	Eli Parvizi: Population genomics insights into invasion success in the agricultural pest, <i>Halyomorpha halys</i>
12:25PM-2:00PM	LUNCH; Room: PLAYHOUSE FOYER
2:00PM-2:40PM	SESSION FOUR: Mechanisms; Room: TE WHARE Keynote Four: Kathryn Turner Talk title: Invasive plant genomics in a temporal context
2:40PM-2:55PM	Annabel Whibley: Invasion genomics of the common myna in New Zealand
2:55PM-3:10PM	Paul Battlay: Population-genomic inversion signatures underlie local adaptation in white clover invasions
3:10PM-3:25PM	Jonathan Wilson: Structural variation underlies rapid adaptation in an invasive weed
3:25PM-3:40PM	Amy Vaughan: Identifying genomic signatures of invasiveness for biosecurity
3:40PM-4:10PM	AFTERNOON TEA; Room: PLAYHOUSE FOYER
4:10PM-5:00PM	Discussion leading up to Day Three
5:00PM-6:30PM	Open Bar: Playhouse Foyer
6:30PM	CONFERENCE DINNER; Room: TE WHARE

WEDNESDAY 9th NOVEMBER	
ZOOM LINK: https://waikato.zoom.us/j/81855912857	
9:00AM-10:00AM	SESSION FIVE: Open discussion: review paper; Room: TE WHARE Overview of a collective paper
10:00AM-10:30AM	MORNING TEA; Room: PLAYHOUSE FOYER
10:30AM-11:15AM	Breakouts by theme
11:15AM-12:00PM	Group reconvenes / task assignment
12:00PM-1:00PM	LUNCH; Room: PLAYHOUSE FOYER
1:00PM-2:50PM	SESSION SIX: Open discussion: collaborative opportunities; Room: TE WHARE Open discussion
2:50PM-3:00PM	CONFERENCE CLOSE; Room: TE WHARE

Website



Conferences

INAUGURAL
INVASOMICS
CONFERENCE 2022

SMBE EVERYWHERE
2022/2023

OTHER CONFERENCE
ANNOUNCEMENTS



SMBE Regional Meeting on The Role of the Genome in Biological Invasion (New Zealand)

Dates: 6 - 9 November 2022

Location: University of Waikato Campus, Hamilton, New Zealand and virtual — this was a hybrid event:



Meeting location: [The Gallagher Academy of Performing Arts \(GAPA\)](#) at the University of Waikato

Invited speakers

Two amazing plenary speakers:



Prof Neil Gemmell, University of Otago, Dunedin, New Zealand



Assoc Prof Lee Rollins, University of New South Wales, Sydney, Australia

Four marvellous keynote speakers:



Assist Prof Kathryn Turner, Idaho State University, ID, United States



Assoc Prof Rob Colautti, Queen's University, Ontario, Canada



Assist Scientist Carolyn Tepolt, Woods Hole Oceanographic Institution, MA, USA



Prof Dianne Gleeson, University of Canberra, Canberra, Australia

List of participants

See p39 of conference booklet.

Photos of the event







