

# Auckland Numerical Ordinary Differential Equations

## ANODE 2023

20 – 24 February, 2023

Mathematics Department, University of Auckland

## Conference Programme

for on line programme information see

<https://www2.mathematik.uni-halle.de/anode2023/programme/>

# Programme at a glance

Monday	Tuesday	Wednesday	Thursday	Friday
	9:00 Yuto Miyatake	9:00 Helmut Podhaisky	9:00 Shun Sato	9:00 James Sneyd
9:30 Opening		9:30		
9:45 Nicolas Privault	9:45 Stefan Kopecz	New Books John Butcher Robert Corless David Ketcheson Joel Schiff	9:45 Adrian Sandu	9:45 Kansei Ushiyama
10:30 Tea/Coffee	10:30 Tea/Coffee	10:30 Tea/Coffee	10:30 Tea/Coffee	10:30 Tea/Coffee
11:15 Julien Alexandre dit Sandretto	11:00 Raymond Spiteri	11:00 Robert McLachlan	11:00 Hinke Osinga	11:00 Jim Verner
12:00 Lunch	11:45 Siqi Wei	11:45 Reinout Quispel	11:45 Richard Tsai	11:45 John Butcher
	12:30 Lunch	12:30	12:30 Lunch	12:30
13:30 Kevin Burrage	13:30 Mayya Tokman		13:30 Ewa Weinmüller	
14:15 David Ketcheson	14:15 Valentin Dallerit		14:15 Tim Steinhoff	
15:00 Tea/Coffee	15:00 Tea/Coffee		14:45 Tea/Coffee	
15:30 Robert Corless	15:30 Luan Vu Thai		15:15 Pamela Burrage	
16:15 Tommaso Buvoli	16:15 Paul Muir		15:45 Taketomo Mitsui	
17:00	16:45		16:15	

# Lecture programme, Monday 20 February 2023

## Chair Steven Galbraith

9:45 Nicolas Privault Nanyang Technological University  
*Numerical evaluation of ODE solutions by Monte Carlo enumeration of Butcher series*

## Chair Richard Tsai

11:15 Julien Alexandre dit Sandretto Institut Polytechnique de Paris  
*Sets and B-series*

## Chair Helmut Podhaisky

13:30 Kevin Burrage Queensland University of Technology  
*Parameter Inference and Uncertainty Quantification using Information Geometry: an overview*

14:15 David Ketcheson King Abdullah University of Science & Technology  
*Software for computing with B-series*

## Chair Robert McLachlan

15:30 Robert Corless Western University  
*A Hermite–Obreshkov Method for the Mathieu Equation*

16:15 Tommaso Buvoli Tulane University  
*A New Class of Fully-Implicit-Explicit Time Integrators*

# Lecture programme, Tuesday 21 February 2023

## Chair Reinout Quispel

9:00 Yuto Miyatake Osaka University

*A family of fourth-order energy-preserving integrators*

9:45 Stefan Kopecz University of Kassel

*Stability of Patankar-type schemes*

## Chair Jim Verner

11:00 Ramond Spiteri University of Saskatchewan

*Fractional-Step Runge–Kutta Methods: Representation and Linear Stability Analysis*

11:45 Siqi Wei University of Saskatchewan

*Strategies of doing operator splitting*

## Chair Ewa Weinmüller

13:30 Mayya Tokman University of California, Merced

*Some Dos and Donts of Exponential Integration*

14:15 Valentin Dallerit University of California, Merced

*Phi-order condition and stiffness resilient exponential integrators*

## Chair Julien Alexandre dit Sandretto

15:30 Luan Vu Thai Mississippi State University

*Exponential B-series and construction of sixth-order parallel exponential Runge–Kutta methods*

16:15 Paul Muir Saint Mary's University

*Numerical Software for the Computation of Error-Controlled Continuous Approximate Solutions of Differential Equations*

# Lecture programme, Wednesday 22 February 2023

## Chair Raymond Spiteri

9:00 Helmut Podhaisky Martin Luther University Halle–Wittenberg

*On randomized implicit Runge–Kutta methods*

9:30 New Book Session

John Butcher *B-series: Algebraic Analysis of Numerical Methods, Springer, 2021*

Robert Corless *Computational Discovery on Jupyter, SIAM 2022*

David Ketcheson *Riemann Problems and Jupyter Solutions, SIAM 2020*

Joel Schiff *Topics in Complex Analysis, De Gruyter 2022*

## Chair Taketomo Mitsui

11:00 Robert McLachlan Massey University

*Two geometric integrators*

11:45 Reinout Quispel La Trobe University

*Building superintegrable Lotka–Volterra systems using Darboux polynomials*

## Free time Wednesday from 12:30

This is a free afternoon to rest or explore some of the sights of Auckland.

If you would like to explore Auckland sights with a small group of other participants, wait in the lecture theatre at 12:30 and join up with others who have similar interests.

Here are some suggestions:

- Walk to the Domain with the Wintergardens and the War Memorial Museum
- Walk to Mt Eden and enjoy the view from the vicinity of the crater
- Visit the Auckland Art Gallery
- Walk to the foot of Queen St and take a ferry to Devonport

# Lecture programme, Thursday 23 February 2023

## Chair Mayya Tokman

09:00 Shun Sato University of Tokyo  
*High-order linearly implicit schemes conserving quadratic invariants*

9:45 Adrian Sandu Virginia Tech  
*Multimethod approaches in time integration*

## Chair John Butcher

11:00 Hinke Osinga University of Auckland  
*A boundary-value-problem approach to phase sensitivity*

11:45 Richard Tsai University of Texas at Austin  
*Enhancing multiscale integrators by data*

## Chair David Ketcheson

13:30 Ewa Weinmüller Vienna University of Technology  
*Efficient Solution of BVPs in ODEs and DAEs with Singularities*

14:15 Tim Steinhoff Gesellschaft für Anlagen und Reaktorsicherheit  
*Adaptive Order Strategies for Finite Iteration RK Methods of High Stage Order*

## Chair Adrian Sandu

15:15 Pamela Burrage Queensland University of Technology  
*Equation-learning for Cancer Models*

15:45 Taketomo Mitsui Nagoya University  
*Complex analysis applied to numerical differential equations*

# Lecture programme, Friday 24 February 2023

## Chair Shun Sato

09:00 James Sneyd University of Auckland  
*Calcium and Spit*

9:45 Kansei Ushiyama University of Tokyo  
*Extending discrete gradients for unified description and analysis of optimization methods*

## Chair Robert Corless

11:00 James Verner Simon Fraser University  
*Nullspaces yield new explicit Runge–Kutta pairs*

11:45 John Butcher University of Auckland  
*High order Runge–Kutta methods revisited*

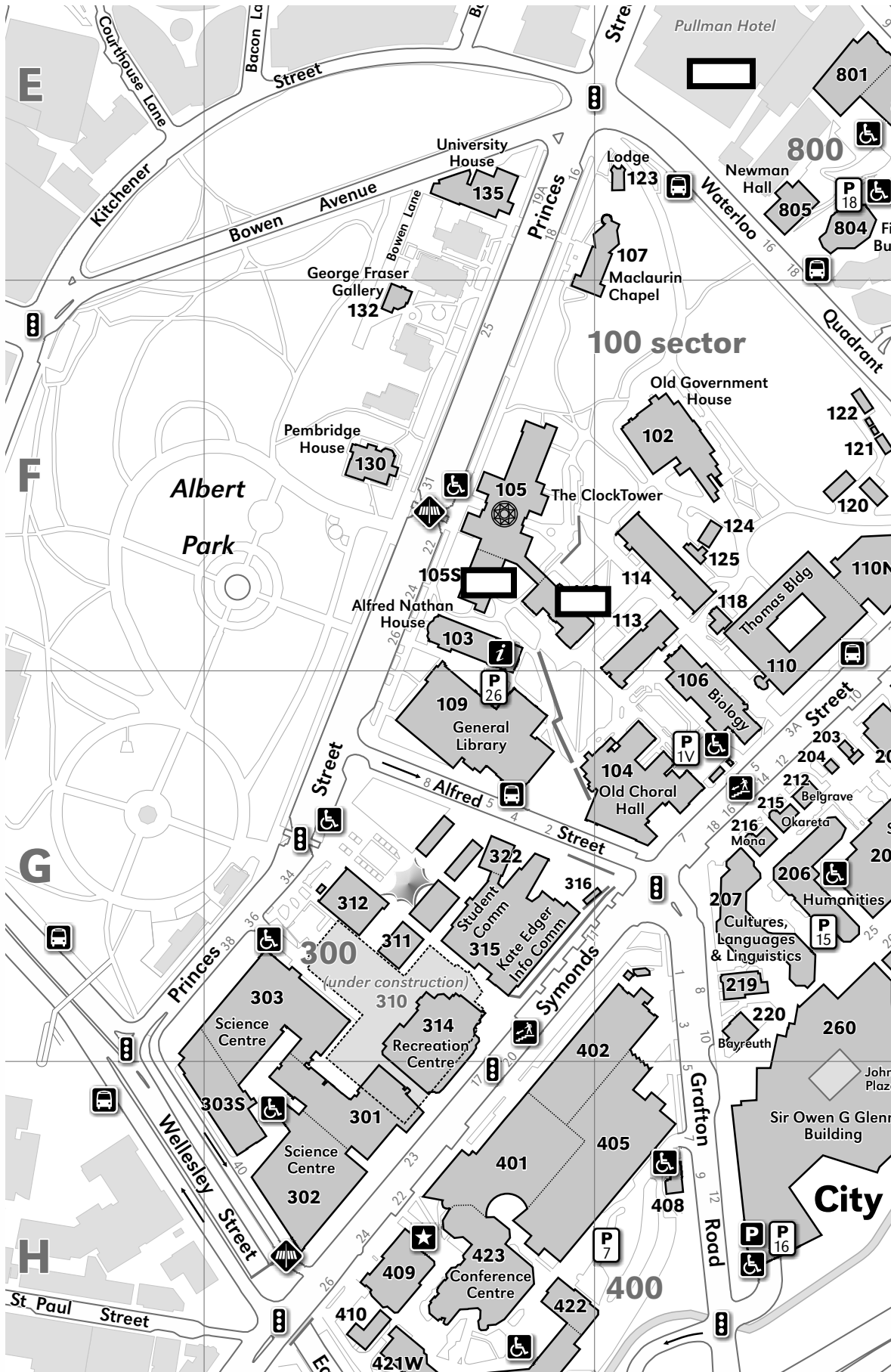
## Social events during ANODE 2023

*Welcome Party* Sunday, 19 February, 13:00–22:00  
16 Wallace St, Herne Bay

*Schubertiade* Tuesday, 21 February, 19:30–22:00  
16 Wallace St, Herne Bay

*Banquet* Thursday, 23 February, 18:00–22:30  
Pullman Hotel

# University of Auckland Campus Map



Banquet

Lectures  
Tea/coffee

Bus stop

AUT bus stop

100 sector

City