



30th Biennial Conference
on
Numerical Analysis

24 - 27 June, 2025

Programme

Dear Participant,

On behalf of the Strathclyde Numerical Analysis Group, it is our pleasure to welcome you to the 30th Biennial Numerical Analysis conference. This is the eighth time the meeting has been held at Strathclyde, continuing the long series of conferences originally hosted in St. Andrews, and then Dundee, and marks the 60th anniversary of this event. We are delighted to have over 300 registered participants from all over the world, some who are familiar faces at this series of meetings, but also many who are attending for the first time.

The conference is rather unusual in the sense that it seeks to encompass all areas of numerical analysis, and the list of invited speakers reflects this aim. We have once again been extremely fortunate in securing a top line-up of plenary speakers, and we very much hope that you enjoy sampling the wide range of interesting topics which their presentations will cover. The specialised minisymposia and sessions of contributed talks scheduled cover a wealth of additional areas, confirming the continued strength of numerical analysis as an active field of research 60 years since the first meeting in the series. This year we have 28 minisymposia and approximately 60 contributed talks. Thanks to all of you for making this conference so varied and exciting!

The meeting is funded almost entirely from the registration fees of the participants. We are also thankful to have again received sponsorship from the UKIE section of the *Society for Industrial and Applied Mathematics* for three prizes for the best student talks. A special thanks goes to our prize committee for taking on the arduous task of selecting the winners. If past meetings are anything to go by, it will be a very hard-fought competition!

Outwith the scientific content, we hope you will also enjoy meeting new people and socialising with the other participants. We are indebted to the *City of Glasgow* for once again generously sponsoring a wine reception in the spectacular City Chambers building: this will take place on Tuesday evening. Another social highlight will be our conference dinner on Thursday evening, which will be held in Òran Mór, another of Glasgow's impressive historic buildings.

Welcome to Glasgow, and enjoy the meeting!

Francesca Arrigo
Gabriel R. Barrenechea
Philip Knight
Jennifer Pestana

Conference Organising Committee

NACONF 2025: Important information for participants

- **Registration**

Registration desks are located in the entrance foyer of the John Anderson building. Registration times are as follows. Monday between 17:00 and 19:00; Tuesday from 8:00; Wednesday and Thursday from 8:30. We would also kindly ask those of you who can to please register on the Monday evening.

- **Information for speakers**

1. Speakers should go to the allocated room during the coffee or lunch break prior to their session to load their talk onto the conference laptop. Due to time constraints, use of personal laptops will **not** be permitted.
2. Each speaker has an allocated slot of 20 minutes. **Please do not exceed your allotted time.**
3. Student speakers should identify themselves to the chairperson at the beginning of the session (so they can be considered for the SIAM UKIE prize, see below).

- **Room Locations**

This year the conference is split between two buildings. The Learning and Teaching building (room numbers beginning “TL” in the programme) and the John Anderson building (room numbers beginning “JA” in the programme). On Tuesday, there will be volunteers guiding attendees to the Learning and Teaching building.

- **Session chairs**

1. **Please check the final programme to see if you are listed as chairing a session.** If you are, we hope that you will be willing to help in this way.
2. Minisymposium organisers should organise chairpersons for their own sessions (including any contributed talks which follow) as appropriate.
3. Each speaker has an allocated slot of 20 minutes. After each talk, a break of 5 minutes has been allowed for moving between rooms. This time may be used for questions if required. **Please keep speakers to the timetable.**
4. Session chairs are asked to help with judging the SIAM UKIE student prize (see below).

- **Book of abstracts**

The book of abstracts is available at <https://numericalanalysisconference.org.uk/conferences/2025/participants>, and can be accessed via the QR code below



- **SIAM UKIE Student Prize**

The UK and Ireland section of SIAM has kindly agreed to sponsor the award of three prizes at the meeting for the best student presentations.

1. The prizes will be awarded by a committee consisting of Zhaonan Dong, Dante Kalise, Natalia Kopteva, and Alison Ramage.
2. Student speakers should make themselves known to their session chair before their talk.
3. Session chairs should fill in a **Student Talk Feedback Form** (available in the meeting rooms) for each student talk in their session. On completion, these forms should be passed to a member of the committee or one of the local organisers.

4. The results of the competition will be published in NA Digest after the meeting.

- **Letters of attendance/receipts**

If you require any additional paperwork, such as a letter confirming that you have attended the meeting (and/or given a presentation) or a formal receipt for payment, please email your request to **naconf@strath.ac.uk** by Friday June 27th. These letters will be prepared and despatched via email during the week following the meeting.

- **Meals**

The times of lunches and coffee breaks are as indicated in the conference programme. Buffet lunches will be served in the Todds Cafe, followed by coffee and tea served in the foyer outside JA325. Coffee and tea will be provided at the advertised times in signposted locations in the John Anderson building.

- **Reception**

A reception for all registered participants hosted by Glasgow City Council will be held in the City Chambers on Tuesday 24th June from 20.00 to 21.00. Entry to the City Chambers is from George Square.

- **Conference dinner**

The conference dinner will be held in Òran Mór on Thursday 26th June at 19:30 (for 20:00 dinner).

The venue is located at the top of Byres Road (G12 8QX). Òran Mór can be reached by subway (Hillhead station), bus (First bus services 6 and 6A) or, for those of you wishing to stretch your legs, on foot (approx. 50 minutes).

- **Computing facilities**

Wireless access is available in all of the meeting rooms via **eduroam** (login using credentials supplied by your home institution) and **The Cloud** (to connect, create a (free) account).

- **Book displays**

There will be books on display for the duration of the conference in room JA326.

- **Luggage on Friday**

Luggages may be left in JA326 and JA327 until 14:00.

- **Bars and restaurants**

There are many bars and restaurants in the Merchant City area located to the south of the campus which are suitable for dinner and refreshments. Some of our favourites are

1. Babbity Bowster, 16-18 Blackfriars St, Glasgow G1 1PE;
2. Drygate Bar, Kitchen and Brewing Co., 85 Drygate, Glasgow G4 0UT;
3. Paesano Pizza, 94 Miller St, Glasgow G1 1DT;
4. Brewdog Merchant City, 99 Hutcheson St, Glasgow G1 1SN;
5. Turkiye EFES Restaurant, 97-99 Candleriggs, Glasgow G1 1NP;
6. Cafe Gandolfi, 64 Albion St, Glasgow G1 1NY;
7. Rab Ha's Pub/Eatery, 83 Hutcheson St, Glasgow G1 1SH.

- **Sports facilities**

Conference delegates can use the University sports facilities in the new Sports Centre (situated on Cathedral Street) for a small fee. More information is available here: <https://www.strath.ac.uk/strathclydesport/facilities/>.

Booking is not required for the gym or for swim sessions, but is required for all other activities.

- **Toilets**

Gender Neutral/Accessible toilets can be found on Level 1, 2, 3, 4, and 8 of the Teaching and Learning building. Accessible toilets are also located within the John Anderson building.

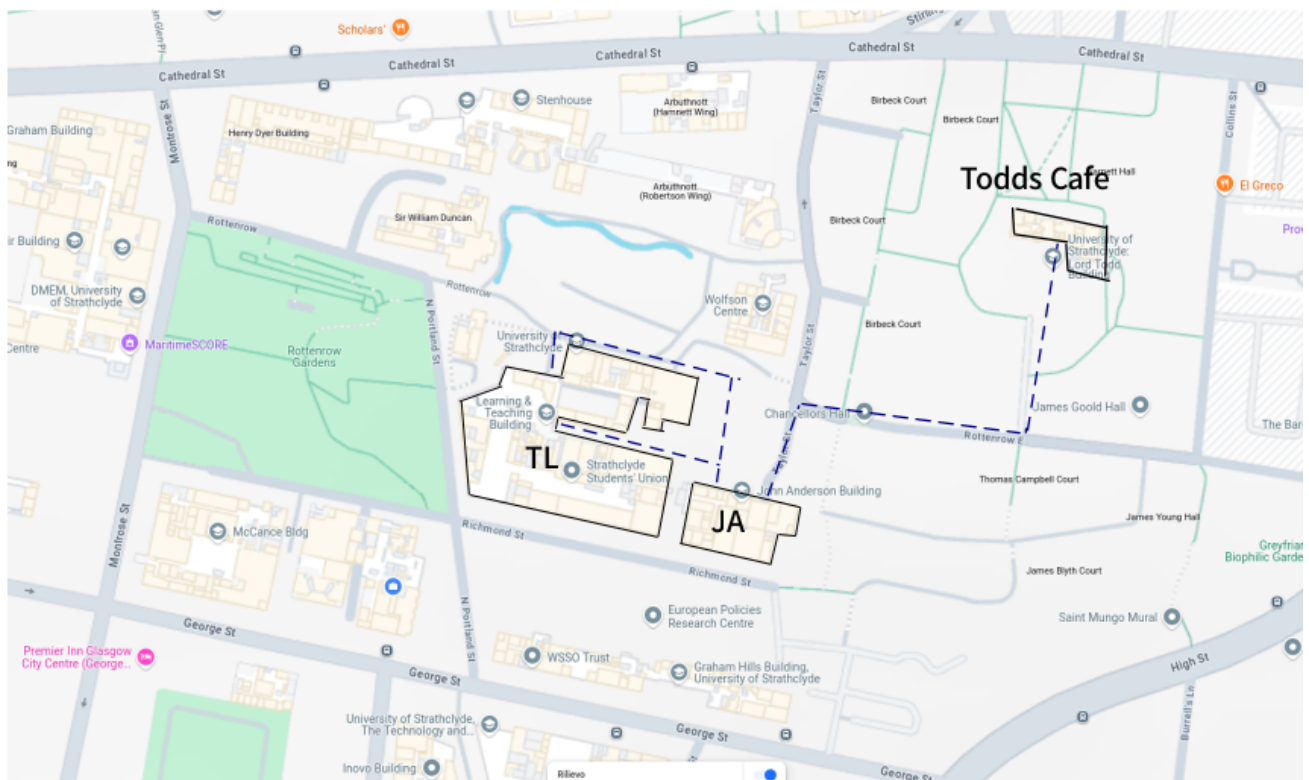


Figure 1: Campus Map

Tuesday 24th June - at a glance

08:00-18:00	Registration (Coffee from 8:00)	Entrance Foyer, John Anderson building
CONFERENCE STARTS		
09:00-09:05	Opening remarks	<i>Room:</i> JA325
09:05-10:00	M Rognes "Brain membranes and vasculature: a computational mathematics tale of dimensional gaps"	<i>Room:</i> JA325, <i>Chair:</i> F Arrigo
10:00-10:55	N Gillis "Nonnegative Tucker Decomposition: Introduction, Identifiability and Algorithms"	
10:55-11:20	COFFEE BREAK - Foyer outside JA325	
11:20-13:00	Morning Parallel Sessions: M2, M10, M13, M19, M21, M23, M25, CT1, CT2, CT3	Various locations
12:35-14:05	LUNCH - Todds Cafe	
13:30-14:00	COFFEE BREAK - Foyer outside JA325	
14:05-15:00	E Burman "Computational Unique Continuation"	<i>Room:</i> JA325, <i>Chair:</i> J Mackenzie
15:05-16:20	Afternoon Parallel Sessions: M2, M4, M9, M13, M19, M21, M23, CT4, CT5	Various locations
16:20-16:45	COFFEE BREAK - Foyer outside JA325	
16:45-17:55	A Wathen "Preconditioning and iteration for linear systems"	<i>(A R Mitchell Lecture)</i> <i>Room:</i> JA325, <i>Chair:</i> A Ramage

Social Events

20:00-21:00	DRINKS RECEPTION - Glasgow City Chambers
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Minisymposia

M2	Advances on nonstandard Galerkin methods - Part 1	M19	Advances in Linear Algebra and Preconditioners
M4	Numerical Methods for Mean Field Games	M21	Quantum Numerical Algorithms
M9	Recent Advances in Numerical Methods for Modern Materials	M23	Approximating complex systems: Surrogates, reduced order modelling and dimension reduction
M10	Special Numerical Linear Algebra: Numerical advances at the interface of linear algebra and special functions	M25	Numerical Analysis and AI
M13	Advanced numerical techniques for kinetic equations		

Tuesday 24th June

Room: JA325		M19	Room: JA314		M2	Room: JA317		M13	Room: JA327		CT1
									Chairperson: C Cotter		
11:20-11:45	N Bootland		M Jensen			L Pareschi			J Novo		
	Preconditioning for high-frequency time-harmonic waves with directional sweeping		Data-dependent density estimation for the Fokker-Planck equation in higher dimensions			Structure-preserving neural network surrogates for kinetic equations with uncertainty			Optimal bounds for POD approximations of infinite horizon control problems based on time derivatives		
11:45-12:10	Y Liu		N Tran			D Caparello			B García-Archilla		
	Conjugate Direction Methods Under Inconsistent Systems		A hybrid high-order method for the biharmonic problem			Hierarchical domain decomposition method for the multi-scale Boltzmann equation with geometry			Pointwise error bounds in POD methods without difference quotients		
12:10-12:35	T-C Riemer		C Döding			T Laidin			R Lautenshlager		
	A Low-Rank Tensor approach for Local Refinement in IGA		Vortex-capturing multiscale spaces for the Ginzburg-Landau model of superconductivity			A Parallel in time numerical method for the collisional Vlasov equation in the hyperbolic scaling			Surrogate modelling for sparse parameter- and time-dependent data		
12:35-13:00									A Contri		
									A biologically-driven FEM framework for mixed dimensional PDEs on evolving realistic geometries		
Room: JA325		M19	Room: JA314		M2	Room: JA317		M13	Room: JA327		CT4
									Chairperson: T Ranner		
15:05-15:30	F Chen		L Zhao			H Im			A Bansal		
	Convergence Behavior of GMRES on Tridiagonal Toeplitz Systems		A new control volume method for linear elasticity on quadrilateral grids			A BGK Model for Particle Swarm Optimization with Jumps			A Nitsche Approach for Coupled Multiphysics Problems		
15:30-15:55	K Soodhalter		A Rupp			M Sadr			C Cárcamo		
	Filtration of Lanczos vectors in hybrid CG Tikhonov iteration		Finite element methods for parametric PDEs			From Variance Reduction to Density Estimation: Interplay of Entropy and Moments			A finite element method for a perturbed Navier-Stokes Problem arising from 4D-Flow MRI		
15:55-16:20	R Abu-Labdeh		S Congreve			A Medaglia			S Joshi		
	GMRES upper bound based on ϵ -pseudospectra for preconditioned Toeplitz systems		Nonconforming virtual element method for the fully nonlinear Monge-Ampère equation			Particle methods for kinetic equations with random inputs			A Nonconforming Least-Squares Spectral Element Method for 2D/3D Stokes Problems with Discontinuous Viscosity and Singular Forces		

Tuesday 24th June

<i>Chair:</i>	<i>Room:</i> TL565	M23	<i>Room:</i> TL560 Chairperson : M Sabaté	CT2	<i>Room:</i> TL557	M10	<i>Room:</i> TL553	M21
11:20-11:45	C Cartis Dimensionality reduction and learning for optimization problems		A Awari Alternating Direction Method of Multipliers (ADMM) for Nonlinear Matrix Decompositions		M Webb Low Rank Approximation of Analytic Kernels		C Higham Hybrid Classical and Quantum Deep Learning	
11:45-12:10	E Addy Lengthscale-informed sparse grids for high dimensional Gaussian process emulation		Z Bujanović Randomized algorithms with random Khatri-Rao product matrices		C Ballew The Akhiezer iteration for matrix functions and Sylvester equations		N Blunt Fault-tolerant quantum simulation of generalized Hubbard models	
12:10-12:35	T El Ahmad Sketch In, Sketch Out: Accelerating both Learning and Inference for Structured Prediction with Kernels				R Slevinsky Matrix equations and orthogonal polynomials		T Elliott Quantum dimension reduction for stochastic simulation	
12:35-13:00							G Chen Quantum algorithms for the exponential of Hamiltonian matrices	
	<i>Room:</i> TL565	M23	<i>Room:</i> TL560 Chaiperson: S Güttel	CT5	<i>Room:</i> TL557	M9	<i>Room:</i> TL553	M21
15:05-15:30	J Li Nonlinear reduction model for solving parameterized PDE problems using machine learning techniques		P Koev Towards Computing Eigenvectors of Tridiagonals to High Relative Accuracy in $O(n^2)$ Time		A Majumdar Solution Landscapes in the Landau-de Gennes Theory for Nematic Liquid Crystals		C McKeever Selected results on quantum numerical algorithms at Quantinuum	
15:30-15:55	B Kent Multi-Index Stochastic Collocation for PDEs with Imperfect Solvers		K Roy CLASSIX beyond the Euclidean norm		H Normington A decoupled, convergent, and fully linear nodal projection free integrator for the Landau-Lifshitz-Gilbert equation including magnetostriction		T Hartung On Convergence and Efficiency of Quantum Imaginary Time Evolution	
15:55-16:20	C Powell Reduced Basis Methods for Computing Stochastic Galerkin Surrogates		S Saha More on Nonnegative Tucker Decompositions		N Nataraj Lowest-order nonstandard FEM for Extended Fisher Kolmogorov Equations		E Babson Discovering a compiler for a quantum device	

Tuesday 24th June

	<i>Room: TL423</i>	M25	<i>Room: TL455</i>	CT3
11:20-11:45	M Pereyra Equivariant variational auto-encoders for self-supervised Bayesian uncertainty quantification in imaging inverse problems		G Elefante Adaptive RBF cubature method for scattered data on spherical polygons	
11:45-12:10	Ch Jiménez Beltrán Neural Network Surrogates for Bayesian Inverse Problems		I Powell An Adaptive Sampling Scheme for Level-set Approximation	
12:10-12:35	A-L Haji-Ali Bayesian computation with generative diffusion models by Multilevel Monte Carlo		D Ruiz-Antolín (Chairperson) Asymptotic and numerical approximations to the zeros of parabolic cylinder functions	
12:35-13:00	A Issagali Inexpensive adversarial attacks on image classifiers		P-A Hofmann Fast Newton Transform: Interpolation in Downward Closed Polynomial Spaces	
	<i>Room: TL423</i>	M4		
15:05-15:30	D Gomes Monotonicity-based methods for mean-field games			
15:30-15:55	Y Osborne Nearly and Fully Quasi-optimal Finite Element Approximations of Second-order Mean Field Game Systems			
15:55-16:20	E Carlini Numerical Approximations of Newton algorithm for Mean Field Games			

Wednesday 25th June - at a glance

08:30-18:00	Registration (Coffee from 08:30)	Entrance Foyer, John Anderson building
09:00-09:55	R Herzog "Krylov Subspace Methods with a Twist"	<i>Room: JA325, Chair: J Pestana</i>
10:00-10:55	B Li "Challenges, numerical analysis, and new computational methods for geometric flows and moving interface problems"	
10:55-11:20	COFFEE BREAK - Foyer outside JA325	
11:20-13:00	Morning Parallel Sessions: M1, M2, M4, M7, M9, M10, M17, M28, CT6, CT7	Various locations
12:35-14:05	LUNCH - Todds Cafe	
13:30-14:00	COFFEE BREAK - Foyer outside JA325	
14:05-15:00	X Li "Fast Construction of Hierarchically Low-Rank Matrices Using Randomized Sketching"	<i>Room: JA325, Chair: P Knight</i>
15:05-16:20	Afternoon Parallel Sessions 1: M1, M3, M7, M10, M17, M25, M26, CT8, CT9, CT10	Various locations
16:20-16:45	COFFEE BREAK - Foyer outside JA325	
16:45-18:25	Afternoon Parallel Sessions 2: M1, M3, M5, M7, M16, M17, M25, M26, CT11, CT12	Various locations

Minisymposia			
M1	Numerical methods for surface and interface dynamics	M10	Special Numerical Linear Algebra: Numerical advances at the interface of linear algebra and special functions
M2	Advances on nonstandard Galerkin methods - Part 1		
M3	Advances on nonstandard Galerkin methods - Part 2	M16	Structure-preserving finite element methods
M4	Numerical Methods for Mean Field Games	M17	Numerical methods for optimization with PDE constraints
M5	Interplay of solvers, discretisations and geometries in the numerical approximation of eigenvalue problems	M25	Numerical Analysis and AI
M7	Recent Advances in Randomised Numerical Linear Algebra	M26	The finite element method for problems in multiphysics and geometry - Part 1
M9	Recent Advances in Numerical Methods for Modern Materials	M28	Advances in numerical analysis techniques for complex networks

Wednesday 25th June

<i>Chair:</i>	<i>Room: JA325</i>	M1	<i>Room: JA314</i>	M2	<i>Room: JA317</i>	M9	<i>Room: JA327</i>	CT6
11:20-11:45	A Bonito Modeling and Simulation of Paper Folding		A Cangiani Virtual element methods for a class of fully nonlinear elliptic PDEs		S Yang Accelerated gradient flows in projection-free approximation of some nonconvex constrained variational problems		A Hegarty (Chairperson) Uniformly convergent numerical methods for singularly perturbed convection-diffusion problems with interior layers on curvilinear domains	
11:45-12:10	G Gao Convergence of finite element methods for Ricci flow		G Pichot Adaptive mesh strategies to speed up flow simulations in large-scale fractured media		R Maity Numerical analysis for constrained and unconstrained Q -tensor energies for nematic liquid crystals		S Jangra Non-Conforming Least Square Spectral Element Method for Elliptic Boundary Layer Problems on Smooth Domains	
12:10-12:35	F Heimann Higher Order Unfitted Space-Time Methods for moving domain problems		P Herbert An asymptotically hypocoercive space-time discontinuous Galerkin method for the Kolmogorov equation		V Lleras A non conformal method for hyperelastic problem combined with neural network		J-P Croisille Numerical approximation of the Munk equation with a compact scheme	
12:35-13:00	S Walker Space-time Control of Stokes Swimmers						A Trenam Nodally bound-preserving discontinuous Galerkin methods for charge transport	
	<i>Room: JA325</i>	M1	<i>Room: JA314</i>	M3	<i>Room: JA317</i>	M26	<i>Room: JA327</i>	CT8
15:05-15:30	P Pozzi Elastic Flow Revisited		R Guo On the VEMs and IFEMs: spaces, complexes and the applications to electromagnetic interface problems		F Aznaran The diffuse interface approach to fluid-structure interaction		N Bullerjahn (Chairperson) Error estimates for full discretization by an almost mass conservation technique for a Cahn–Hilliard system with dynamic boundary conditions	
15:30-15:55	B Stinner Error analysis of a finite element scheme for rough PDEs on evolving curves		P Ledger How far are two symmetric matrices from commuting? With an application to object characterisation and identification using hp -FEM in metal detection		C Parrow Partitioned Methods for Fluid-Poroelastic Structure Interaction Based on Robin Boundary Conditions		M Lantelme A posteriori error analysis for Cahn–Hilliard on a bulk-surface with dynamic boundary conditions	
15:55-16:20	R Tang Dynamic Ritz projection of finite element methods for fluid-structure interaction		T Pryer A Positivity-Preserving Finite Element Framework for Accurate Dose Computation in Proton Therapy		A Baier-Reinio High-order finite element methods for multicomponent convection-diffusion		F Zohra Nouri Mathematical Modeling and Simulation for Multiphase Flows	

Wednesday 25th June

	Room: JA325	M1	Room: JA314	M3	Room: JA317	M26	Room: JA327	M16
16:45-17:10	B Kovács A convergent finite element algorithm for flows by powers of the Gaussian curvature		S Zahedi A cut finite element method for problems in evolving domains		H von Wahl Cause and Cure of Spurious Boundary Forces in an Eulerian Finite Element Method for Moving Domain Flow Problems		B Andrews Designing conservative and accurately dissipative numerical integrators via auxiliary variables	
17:10-17:35	Y Li An Energy-stable Numerical Approximation for the Willmore Flow		S Lemaire Equivalence of mixed and nonconforming polytopal methods		R Durst Anderson acceleration for problems with sparse regularization		M He Structure-preserving discretisation for the magnetofrictional equations in the Parker conjecture	
17:35-18:00	B She Stability of an ALE method for fluid-structure interactions		P Paraschis hp -Version discontinuous Galerkin methods for the p -Laplacian		G Barrenechea Implicit-explicit schemes for incompressible flow problems with variable viscosity and density		A Brunk Structure-preserving approximation and error analysis for a viscoelastic phase separation model	
18:00-18:25	C Venkataraman Free-boundary limits of a model for receptorligand interactions on evolving domains		A Savinov Goal-oriented adaptive stochastic collocation finite element method for PDEs with log-normal parametrisation of coefficients				K Hu Finite element form-valued forms	

Wednesday 25th June

	Room: TL565	M7	Room: TL560 Chairperson : I Graham	CT7	Room: TL557	M10	Room: TL553	M28
11:20-11:45	S Güttel Performance comparison of randomized Krylov solvers for linear systems		B Hennessy Numerical algorithms for nonlinear wave equations via elliptic regularisation		D VandenHeuvel A sparse <i>hp</i> -finite element method for piecewise-smooth differential equations with periodic boundary conditions		R Widdershoven Fast Macaulay Null Space	CT
11:45-12:10	M Sabaté Randomized Inner-Product Free Krylov Solvers for Inverse Problems		A Horning High-order contour integral methods for strongly continuous operator exponentials		S Olver Parallelising PDEs using Representation Theory		F Zigliotto Modeling advection on distance-weighted directed networks	
12:10-12:35	L Burke The numerical stability of sketched GM-RES		H Montanelli Convergence rates of curved boundary element methods for the 3D Helmholtz equation		J Yao A sparse spectral method on domains bounded by algebraic curves		N Deniskin Interlacing of centrality measures and cospectral vertices	
12:35-13:00			A Wisse Convergence of Calderón residuals					
	Room: TL565	M7	Room: TL560 Chairperson : A Trenam	CT9	Room: TL557	M10	Room: TL553 Chairperson : T Elliott	CT10
15:05-15:30	T Park Low-rank approximation of parameter-dependent matrices via CUR decomposition		C Arranz-Simón Rational methods for abstract, initial boundary value problems without order reduction		A Herremans Sampling theory for function approximation with numerical redundancy		R Turner A tailored, matrix free interior point method for fast optimization on gas networks	
15:30-15:55	A Cortinovis Adaptive randomized pivoting for low-rank approximation		S Karch A rigorous a posteriori error bound for the Landau–Lifshitz–Gilbert equation		T Gutleb Parameterizing Intersecting Surfaces via Invariants		G Seraghiti An extrapolated and provably convergent algorithm for nonlinear matrix decomposition with the ReLU function	
15:55-16:20	N Pritchard Small Sketches for Big Matrix Approximations		V Rathi Maxey-Riley-Gatignol Equations for Tracking Lagrangian Devices in Chemical Reactions		G Vasil Orthogonal polynomials and combinatorics		A Reyes-Velazquez Data-driven discovery of chemical reaction networks	
	Room: TL565	M7	Room: TL560		Room: TL557 Chairperson: F Bertrand	M5	Room: TL553	CT12
16:45-17:10	D Halikias Near-optimal hierarchical matrix approximation from matrix-vector products				D Pradovera Approximation of parametric eigenvalues – with applications to interior transmission eigenvalue problems		R Bulle Residual a posteriori error estimates with boundary correction for φ -FEM	(Chairperson)
17:10-17:35	L Lazzarino Extracting Accurate Singular Values from Approximate Singular Subspaces				T Dagli Mixed finite element for Stokes eigenvalue problem		A Hamdam Recovered finite-element methods for the time-Harmonic Maxwell equations	
17:35-18:00	A Bucci Randomized algorithms for streaming low-rank approximation in tree tensor network format				P Zilk The Isospectral Problem for Cracks in Membranes: Perspectives from Spectral Geometry and Numerical Simulation		N Vinod Error Estimates for a Linear Fully-Discrete Finite Element Scheme for the Ferromagnetic Magnetohydrodynamical Model	

Wednesday 25th June

	Room: TL423	M4	Room: TL455	M17
11:30-11:55	H Wells A posteriori error bounds for finite element approximations of steady-state mean field games		D Kalise A Total Variation Flow Scheme for Ergodic Mean Field Games	
11:55-12:20	E Calzola A high-order scheme for mean field games		A Miniguano-Trujillo Fast iterative solvers for bilevel nonlocal denoising with NFFT kernels	
12:20-12:45	A Festa A network model for urban planning		Z Zhong Multi-level Nonlinear Optimal Control with Neural Surrogate Models	
	Room: TL423	M25	Room: TL455	M17
15:05-15:30	Y Wu Tensor-to-tensor models with fast iterated sum features		K Welker Shape optimization on various Riemannian shape spaces	
15:30-15:55	A Singh Wavelet-based Physics-Informed Neural Networks		E Loayza-Romero A Riemannian Approach for PDE-Constrained Shape Optimization Using Outer Metrics	
15:55-16:20	G Conradie Convergent algorithms and impossibility results for Koopman operators on reproducing kernel Hilbert spaces		M Weiß Geometry Denoising with Preferred Normal Vectors	
	Room: TL423	M25	Room: TL455	M17
16:45-17:10	T Vlaar Dissecting Neural Networks		B Heinzlreiter Efficient Iterative Methods for the Solution of Sparse Tree-Coupled Saddle-Point Systems	
17:10-17:35	A Bastounis On the consistent reasoning paradox of intelligence and optimal trust in AI: The power of 'I don't know'		H Wolles Ljósheim Thinking in parallel: Preconditioning variational time-dependent mean field games	
17:35-18:00	D Higham Deceptive Diffusion: Attacking with Generative AI		J Power Adaptivity in PDE-Constrained Optimal Control	CT

Thursday 26th June - at a glance

08:30-18:00	Registration (Coffee from 08:30)	Entrance foyer, John Anderson building
09:00-09:55	M Lukačova "Numerical analysis of oscillatory solutions of compressible flows"	<i>Room:</i> JA325, <i>Chair:</i> G Barrenechea
10:00-10:55	K Schratz "Resonances as a computational tool"	
10:55–11:20	COFFEE BREAK - Foyer outside JA325	
11:20-12:35	Morning Parallel Sessions: M3, M5, M11, M18, M20, M22, M24, M26, CT13, CT14	Various locations
12:35-14:00	LUNCH - Todds Cafe	
13:30-14:00	COFFEE BREAK - Foyer outside JA325	
14:00-15:00	J Gondzio "Nonlinear Techniques to Solve Linear Optimization Problems: Think of Interior Point Methods"	<i>(Fletcher-Powell Lecture)</i> <i>Room:</i> JA325 <i>Chair:</i> E Loayza-Romero
15:05-16:20	Afternoon Parallel Sessions 1: M6, M11, M14, M15, M18, M20, M22, M24, M27, CT15	Various locations
16:20-16:45	COFFEE BREAK - Foyer outside JA325	
16:45-18:00	Afternoon Parallel Sessions 2: M6, M8, M12, M14, M15, M22, M24, M27, CT16	Various locations

Social Events

19:30	SOCIAL DINNER - Òran Mór
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Minisymposia

M5	Interplay of solvers, discretisations and geometries in the numerical approximation of eigenvalue problems	M18	Numerical methods for fractional-derivative problems
M6	High-order and <i>hp</i> - numerical methods for PDEs	M20	Numerical methods for nonlinear dispersive and wave equations
M8	Recent developments in numerical integration, function approximation, and their applications in uncertainty quantification	M22	Advancements and applications of solvers for PDE systems with nonsmooth structures
M11	Numerical analysis for nonlinear PDEs	M24	Recent Advances in Numerical Linear Algebra
M12	Recent advances in numerical linear algebra with insights from scientific machine learning	M26	The finite element method for problems in multiphysics and geometry - Part 1
M14	Numerical methods for PDEs on curved domains or surfaces	M27	The finite element method for problems in multiphysics and geometry - Part 2

Thursday 26th June

	Room: JA325	M22	Room: JA314 Chairperson: F Bertrand	M5	Room: JA317	M24	Room: JA327	CT13
11:20-11:45	M Hintermüller A Descent Algorithm for the Optimal Control of ReLU Neural Network Informed PDEs Based on Approximate Directional Derivatives		N Friess A complex-projected Rayleigh quotient iteration for targeting interior eigenvalues		F Arrigo Updating Katz centrality in complex networks by counting walks		J Jackaman (Chairperson) Discretising (non-local) Poisson operators with finite elements	
11:45-12:10	A Schiela Semi-smooth Newton methods for mappings between nonlinear spaces		L Grubišić Detecting Near Resonances Using Randomized Hierarchical Matrix Factorizations		J Schulze Generalizing Reduced Rank Extrapolation to Low-Rank Matrix Sequences		M Khrais Linearized Localized Orthogonal Decomposition for Nonlinear Nonmonotone PDEs	
12:10-12:35	I Papadopoulos The latent variable proximal point algorithm for variational problems with inequality constraints		Y Voet On the behavior of discrete eigenvalues for lumped mass approximations on trimmed geometries		M Mikaitis Error Analysis of Matrix Multiplication with Narrow Range Floating-Point Arithmetic		A Soenjaya Finite element approximations of a micromagnetic model at elevated temperatures	
	Room: JA325	M22	Room: JA314	M15	Room: JA317	M24	Room: JA327	M6
15:05-15:30	R Baraldi Optimization of Total Variation-Regularized Functions using Inexact Proximal Solves in Hilbert Space		L Bergamaschi Eigenvalue bounds for symmetric multiple saddle-point matrices		M Jones BTOAR: The Two-Level Orthogonal Arnoldi Procedure		Z Dong <i>hp</i> -error analysis of mixed-order hybrid high-order methods for elliptic problems on simplicial meshes	
15:30-15:55	D Kim A Simple Introduction to the SIMPL Method for Density-Based Topology Optimization		A Montoison MinAres and CAR: New Krylov methods for symmetric linear systems		J Fowkes Approximating large-scale Hessian matrices using secant equations		T Wihler Iterative <i>hp</i> -FEM for semilinear Poisson problems with monomial reaction: Exponential convergence and complexity	
15:55-16:20	J Stephens Higher-order bounds-preserving methods for timedependent partial differential equations via variational inequalities		M Koch An H-Matrix Block Preconditioner for the RBF-FD discretized Oseen equations		Z Zhou Computing Accurate Eigenvalues using the Preconditioned Jacobi Algorithm		M Mosconi New Crouzeix-Raviart elements of even degree and variable order Crouzeix-Raviart spaces	
	Room: JA325	M22	Room: JA314	M15	Room: JA317	M24	Room: JA327	M6
16:45-17:10	A Gazca A Nitsche method for fluid flow with set-valued slip boundary conditions		A Martínez Triangular preconditioners for double saddle point linear systems arising in the mixed form of poroelasticity equations		Q Li A Fast BB Reduced Minimization Algorithm for Nonnegative Viscosity Optimization in Optimal Damping		A Miraçi High-order robust iterative solvers and optimal complexity of adaptive FEM	
17:10-17:35	A Kaltenbach Numerical approximation of an optimal insulation problem defined on a polyhedral domain		J Pearson Preconditioners for Multiple Saddle-Point Systems and Applications to PDE-Constrained Optimization		A Prajapati Eigenvalue backward errors of Rosenbrock systems and related optimization problems		C Parker Fast solvers for high-order finite element discretizations of the de Rham complex	
17:35-18:00	C Sirotenko A neural network approach to learning solutions of a class of elliptic variational inequalities		F Mugnaioni Optimal and scalable augmented Lagrangian preconditioners for fictitious domain problems		F Tisseur Deflation Strategies for Nonlinear Eigenvalue Problems		T Radley A Pressure-Robust Hybrid High-Order Method for the Unsteady Navier–Stokes Equations	

Thursday 26th June

	Room: TL565	M18	Room: TL560	CT14	Room: TL557	M20	Room: TL553	M11
11:20-11:45	J M Melenk <i>hp</i> -FEM for the integral fractional Laplacian: quadrature	M Khumalo An overlapping grid spectral collocation analysis on a newly developed hybrid nanofluid flow model	(Chairperson)		S Wang Efficient simulation of wave propagation via low-rank approximation		M Aldé Weak and strong convergence of a BDF2-type integrator for the Landau–Lifshitz–Gilbert equation in micromagnetics	
11:45-12:10	S Kelly Pointwise-in-time error bounds for a fractional derivative parabolic problem on quasi-graded meshes	A Milewski Numerical Convergence of the Regularised Immersed Boundary Method			H Li An Explicit Filtered Lie Splitting Scheme for the Original Zakharov System with Low Regularity Error Estimates in All Dimensions		L Gehring Weighted Aleksandrov Estimates	
12:10-12:35	N Kopteva Pointwise-in-time error estimates for time-fractional semilinear and quasilinear parabolic equations	M Khodak Efficiently Learning Instance-Optimal Linear System Solvers			J Cao Computing rough solutions of the KdV equation below L^2		I Majić From Monge-Ampère to Stochastic Optimal Control	
	Room: TL565	M18	Room: TL560	M14	Room: TL557	M20	Room: TL553	M11
15:05-15:30	E Sousa Numerical analysis of fractional diffusion equations with boundary effects	M Duprez φ -FEM: an optimally convergent and easily implementable immersed boundary method for particulate flow and Stokes equations			F Yao Convergence of a moving window method for the Schrödinger equation with potential on $\mathbb{R}^d$		A Salgado Asymptotic compatibility of parametrized optimal design problems	
15:30-15:55	Y Huang Optimal quadrature for Marchaud derivatives and integral fractional Laplacians	S Frei Numerical analysis of BDF time stepping schemes with implicit extensions for the Stokes equations on evolving domains			F Krumbiegel Enhanced Higher-Order Multiscale Method for the Wave Equation		J Storn Guaranteed upper bounds for iteration errors and modified Kačanov schemes via discrete duality	
15:55-16:20	Y Yan Correction of a high-order numerical method for approximating time-fractional wave equation	C Ma A new framework of high-order unfitted finite element methods using ALE maps for moving domain problems			A Athanassoulis CT A relaxation Crank-Nicolson scheme for the von Neumann equation with power nonlinearity		T Tscherpel A Nitsche method for fluid flow with non-linear and dynamic boundary conditions	
	Room: TL565	M12	Room: TL560	M14	Room: TL557	CT16	Room: TL553	M8
16:45-17:10	S Esche Computing the Posterior Mean in a Multioutput Gaussian Process for separable covariance	J Hu A stabilized arbitrary Lagrangian–Eulerian sliding interface method for fluid-structure interaction with a rotating rigid structure			B McKeon Pauli matrices: a better basis for relativistic electrodynamics?		M Kanagawa Comparing scale parameter estimators for Gaussian process regression: cross validation and maximum likelihood	
17:10-17:35	S MacLachlan Learning components of multilevel preconditioners	A Mavrakis ESFEM for the Lagrangian approach of the full Navier-Stokes equations on evolving surfaces			J Niesen Computing the spectrum of the Schrödinger equation with quasiperiodic potential		T Karvonen Error estimation and superconvergence in kernel interpolation	
17:35-18:00	E Müller Learning efficient solvers for time dependent PDEs on the sphere	S Nepal Random Walk Algorithm for Solving a Moving Boundary Problem Describing Diffusant Penetration into Rubber			M Ruff Error analysis of splitting methods for 3D semilinear wave equations with finite-energy solutions		M Orteu Quasi-Monte Carlo for Bayesian shape inversion with Gevrey regular domain deformations	

Thursday 26th June

	<i>Room:</i> TL423	M3	<i>Room:</i> TL455	M26
11:20-11:45	E Georgoulis Nodally bound-preserving composite discontinuous Galerkin methods		T Ranner Finite element methods for understanding microswimmer locomotion	
11:45-12:10	A Massing Unfitted finite element methods for the biharmonic and Cahn-Hilliard problem in primal form		L Bouck Inf-Sup Stability of Trace Fem for Parabolic Surface PDEs	
12:10-12:35	K MacKenzie The Bound Preserving Method Applied to the 2D Induction Heating Problem		M Ptashnyk Multiscale modelling and simulation of intercellular signalling processes in biological tissues	
	<i>Room:</i> TL423 Chairperson : T Pryer	CT15	<i>Room:</i> TL455	M27
15:05-15:30	A Berrrens A posteriori error control for a finite volume scheme for a cross-diffusion model of ion transport		A Laurain Sensitivity analysis of minimization diagrams and applications	
15:30-15:55	H Liang The nonconforming locking-free virtual element method for the poroelasticity model		O Sander Finsler geodesics and finite-strain plasticity	
15:55-16:20	R Singla A posteriori error analysis of hybrid high order method for elliptic obstacle problem		N Hartney Exploring physics-dynamics coupling with compatible finite element discretisations of moist shallow water equations	
			<i>Room:</i> TL455	M27
16:45-17:10			C Cotter HSS iteration for solving the indefinite Helmholtz equation by multigrid with standard components	
17:10-17:35			G Zhang Isoparametric finite element methods for mean curvature flow and surface diffusion	
17:35-18:00				

Friday 27th June

9:00-9:55	A Townsend “A Mathematical Guide to Operator Learning”			<i>Room: JA325, Chair: Y Kazashi</i>	
10:00-10:55	F Nobile “Iterative and multilevel methods for PDE constrained optimization under uncertainty”				
10:55–11:20	COFFEE/TEA				
	<i>Room: JA325</i>	M8	<i>Room: JA314 M12</i>	<i>Room: JA317</i>	CT17
				Chairperson : N Bootland	
11:20-11:45	Z Pan <i>L₂-approximation using median lattice algorithms</i>		A Paterson Iterative Block Matrix Inversion Algorithm with Applications to Covariance Matrices		P Çiloğlu Efficient solution of Cahn-Hilliard-Navier-Stokes models for organic solar cell production
11:45-12:10	Y Suzuki Optimal numerical integration over the real line: Möbius-transformed trapezoidal rule		S Scott Efficient gradient-based methods for bilevel learning via recycling Krylov subspaces		M Ndjinga A robust preconditioner for saddle-point problems in an industrial context
12:10-12:35	Y Liu Convergence Rates of Randomized Quasi-Monte Carlo Methods under Various Regularity Conditions		P Fink Shustin Dimensionality Reduction Techniques for Global Bayesian Optimisation		A Byrne A Quantum Super-Krylov Diagonalization Method
	<i>Room: TL565</i>	M14	<i>Room: TL560</i>	M28	<i>Room: TL455</i> M6
11:20-11:45	Q Rao Optimal Convergence of an Arbitrary Lagrangian–Eulerian Finite Element Method for Fluid-Structure Interactions		A Filippo A new walk-based centrality index for directed acyclic networks		M Colera-Rico An adaptive spectral element method for systems of conservation laws
11:45-12:10	T Sales Evolving surface finite elements for the Cahn–Hilliard equation with a logarithmic potential		S Alharbi Katz Centrality for Signed Networks		Z Wang <i>hp</i> -version A priori error estimates of a DGCG method for the wave equation in second order formulation
12:10-12:35	P Schwering A Trace Finite Element Method for Navier–Stokes equations on evolving surfaces		D Fasino Role extraction in directed networks by generalised random walks		L Mascotto A posteriori error estimates of a DG-CG method for the wave equation in second order
12:35-14:00	LUNCH - Todds Cafe				
	CONFERENCE ENDS				

Number	Title	Organiser(s)
M1	Numerical methods for surface and interface dynamics	Buyang Li and Rong Tang
M2	Advances on nonstandard Galerkin methods - Part 1	Zhaonan Dong
M3	Advances on nonstandard Galerkin methods - Part 2	Lorenzo Mascotto
M4	Numerical Methods for Mean Field Games	Yohance Osborne, Iain Smears, and Harry Wells
M5	Interplay of solvers, discretisations and geometries in the numerical approximation of eigenvalue problems	Fleurianne Bertrand and Philipp Zilk
M6	High-order and hp - numerical methods for PDEs	Scott Congreve
M7	Recent Advances in Randomised Numerical Linear Algebra	Yuji Nakatsukasa and Taejun Park
M8	Recent developments in numerical integration, function approximation, and their applications in uncertainty quantification	Yoshihito Kazashi and Yuya Suzuki
M9	Recent Advances in Numerical Methods for Modern Materials	Heiko Gimperlein and Ruma Rani Maity
M10	Special Numerical Linear Algebra: Numerical advances at the interface of linear algebra and special functions	Timon S. Gutleb and Marcus Webb
M11	Numerical analysis for nonlinear PDEs	Soeren Bartels and Max Jensen
M12	Recent advances in numerical linear algebra with insights from scientific machine learning	James Jackaman and Jemima Tabeart
M13	Advanced numerical techniques for kinetic equations	Giacomo Borghi and Andrea Medaglia
M14	Numerical methods for PDEs on curved domains or surfaces	Jiashun Hu
M15	Iterative methods and preconditioners for (multiple) saddle point linear systems	Luca Bergamaschi and Angeles Martinez
M16	Structure-preserving finite element methods	Boris Andrews and Charles Parker

Number	Title	Organiser(s)
M17	Numerical methods for optimization with PDE constraints	Estefanía Loayza Romero and John Pearson
M18	Numerical methods for fractional-derivative problems	Natalia Kopteva and Yubin Yan
M19	Advances in Linear Algebra and Preconditioners	Ann Paterson and Razan Abu-Labdeh
M20	Numerical methods for nonlinear dispersive and wave equations	Buyang Li and Katharina Schratz
M21	Quantum Numerical Algorithms	Subhayan Roy Moulik and Pranav Singh
M22	Advancements and applications of solvers for PDE systems with nonsmooth structures	Ioannis Papadopoulos and Michael Hintermüller
M23	Approximating complex systems: Surrogates, reduced order modelling and dimension reduction	Elliot Addy, Benjamin M. Kent, and Aretha Teckentrup
M24	Recent Advances in Numerical Linear Algebra	Françoise Tisseur and Zhengbo Zhou
M25	Numerical Analysis and AI	Alexander Bastounis, Des Higham, and Marcelo Pereyra
M26	The finite element method for problems in multiphysics and geometry - Part 1	Francis Aznaran and Shawn Walker
M27	The finite element method for problems in multiphysics and geometry - Part 2	Francis Aznaran and Shawn Walker
M28	Advances in numerical analysis techniques for complex networks	Francesca Arrigo and Dario Fasino