W O N A P D E 2 0 1 9

SIXTH CHILEAN WORKSHOP ON NUMERICAL ANALYSIS OF PARTIAL DIFFERENTIAL EQUATIONS

PROGRAMME

Universidad de Concepción, Concepción, Chile, January 21–25

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INTRODUCTION

The conference **WONAPDE 2019** has been organized in: Plenary Lectures, Minisymposia, and a Session of Communications.

- Each Plenary Lecture lasts **50 minutes** including questions and comments.
- Each Contribution at a Minisymposium or the Session of Communications lasts **25 minutes** including questions and comments.

The following notation is used to identify the places where the conference is carried on (see included campus map):

AUD-0	Auditorium, Facultad de Ingeniería Building
AUD-1	Auditorium, Empreudec Building
AUD-2	Auditorium, Facultad de Ciencias Forestales Building
AUD-3	Auditorium, Facultad de Ciencias Veterinarias Building
AUD-4	Auditorium, Emprendo Incuba Building
WHITE TENT	Tent located in the parking lot of the Empreudec Building

Please bear in mind that:

- The Conference Secretariat is located in the entrance hall of the Empreudec Building.
- You can **register** on Sunday 20, **15.00–19.00** and on Monday 21, **10.00–13.00** and **14.00–18.00**. Nevertheless, the Conference Secretariat will also remain open during the rest of the week.
- All the Plenary Lectures will be held in **AUD-0**, except the Closing Plenary Lecture in **AUD-1**. In turn, all the Parallel Sessions will be held in **AUD-1**, **AUD-2**, **AUD-3** and **AUD-4**. Rest rooms can be found near each auditorium.
- The Welcome Reception and all the Coffee Breaks and Lunches will be held in the **WHITE TENT**. We kindly request to wear the badges during these activities.

GENERAL SCHEDULE OF THE MINISYMPOSIA

ORGANIZERS	Part I	Part II	Part III	Part IV	Part V
T. Führer, N. Heuer, D. Praetorius	Tuesday: 11.20–13.00	Wednesday: 11.20–13.00	Thursday: 11.20–13.00	Friday: 11.20–13.00	Friday: 15.00–15.50
E. Garau, P. Morin	Tuesday: 11.20–13.00	Tuesday: 15.00–15.25			
A. Bermúdez, R. Rodriguez, P. Venegas	Tuesday: 11.20–13.00	Wednesday: 15.00–16.40	Thursday: 15.00–16.40	Thursday: 17.10–17.35	
S. Caucao, E. Colmenares	Tuesday: 11.20–13.00	Thursday: 17.10–18.25	Friday: 15.00–15.50		
L. Beirão da Veiga, L. Mascotto, D. Mora, G. Vacca	Tuesday: 15.00–16.40	Wednesday: 17.10–18.50	Thursday: 15.00–16.40	Thursday: 17.10–17.35	
P. Goatin, L. Villada	Tuesday: 15.25–16.40	Thursday: 15.00–16.40			
A. Cerfon, T. Sánchez-Vizuet	Tuesday: 15.00–16.40	Wednesday: 17.10–18.50	Thursday: 11.20–13.00		
E. Otárola, A. Salgado	Tuesday: 15.00–16.40	Wednesday: 15.00–16.40	Thursday: 15.00–16.40		
E. Castillo, D. Paredes	Tuesday: 17.10–18.50	Wednesday: 15.00–16.40	Thursday: 17.35–18.50		
C. Vega, D. Zorío	Tuesday: 17.10–18.25	Wednesday: 11.20–13.00			
C. Pérez, D. Shirokoff	Tuesday: 17.10–18.50	Wednesday: 11.20–13.00			
H. Harbrecht, C. Jerez-Hanckes	Tuesday: 17.10–18.25	Thursday: 17.35–18.50			
B. Sprinkle	Wednesday: 11.20–13.00				
A. Barth, I. Kröker	Wednesday: 15.00–16.40	Wednesday: 17.10–18.25			
L.-M. Imbert, F.-J. Sayas	Wednesday: 17.10–18.50	Thursday: 11.20–13.00			
L. Figueroa	Wednesday: 18.25–18.50	Thursday: 17.10–18.50	Friday: 11.20–13.00	Friday: 15.00–15.50	
F. Betancourt, S. Diehl, M. del Carmen Martí	Thursday: 11.20–13.00	Friday: 11.20–13.00			

THE CHAIRPERSONS OF MINISYMPOSIA SESSIONS WILL BE ASSIGNED BY THE RESPECTIVE ORGANIZERS

MONDAY, JANUARY 21 / MORNING

10.00–13.00 REGISTRATION **[EMPREUDEC BUILDING]**

MONDAY, JANUARY 21 / AFTERNOON

14.00–18.00 REGISTRATION **[EMPREUDEC BUILDING]**

18.15–19.20 OPENING CEREMONY **[AUD-O]**

18.15–18.30 WELCOME ADDRESS BY THE RECTOR

18.30–19.20 OPENING PLENARY LECTURE [*Chairman*: M. SOLANO]

Randall J. LeVeque: *Adjoint Methods for Time-Dependent Hyperbolic PDEs and Applications to Tsunami Modeling.*

19.30–21.00 WELCOME RECEPTION **[WHITE TENT]**

TUESDAY, JANUARY 22

09.00–09.50 PLENARY LECTURE **[AUD-0]** [*Chairman*: R. Bürger]

Pep Mulet: *Implicit-Explicit Schemes for Degenerate Convection-Diffusion PDE.*

09.55–10.45 PLENARY LECTURE **[AUD-0]** [*Chairman*: R. Bürger]

Eric Cancès: *Partial Differential Equations for Molecular Simulation: A Guided Tour.*

10.50–11.20 COFFEE BREAK **[WHITE TENT]**

[AUD-1] Robust Numerical Methods in Structural Mechanics and for Higher Order Problems (Part I) [T. Führer, N. Heuer, D. Praetorius]

M. Abbas, A. Ern, N. Pignet: *A Hybrid High-Order Method for Incremental Associative Plasticity With Small Deformations*

A. Alonso-Rodríguez, J. Camaño, E. De Los Santos, R. Rodríguez: *Divergence-Free Finite Elements for the Numerical Solution of a Hydroelastic Vibration Problem*

W. Qiu, J. Shen, K. Shi: *An HDG Method for Linear Elasticity With Strong Symmetric Stresses*

F. Chouly, P. Hild, V. Lleras, Y. Renard: *Nitsche Based Finite Element Method for Contact With Coulomb Friction for the Static and Dynamic Cases.*

[AUD-2] Isogeometric Methods for PDE and Geometrical Problems (Part I) [E. Garau, P. Morin]

M. Actis, P. Morin, M. S. Pauletti: *A New Perspective on Adaptive Hierarchical B-Splines*

P. Morin, R. Nochetto, M. Pauletti: *A Quasi-Optimal Adaptive Algorithm With Hierarchical B-Splines*

G. Gantner, D. Haberlik, D. Praetorius: *Axioms of Adaptivity Revisited: Optimal Adaptive IGAFEM*

E. Garau, F. Gaspoz, P. Morin, R. Vázquez: *A Space-Time Adaptive Scheme for Parabolic Equations*

[AUD-3] Computational Electromagnetism (Part I) [A. Bermúdez, R. Rodriguez, P. Venegas]

D. Tagami: *A Balancing Domain Decomposition Method Incorporating Virtual Elements for Magnetostatic Problems*

D. Boffi, L. Gastaldi, R. Rodríguez, I. Šebestová: *A Posteriori Error Estimates for the Maxwell's Eigenvalue Problem*

A. Moiola, E. Spence: *Acoustic and Electromagnetic Transmission Problems: Wavenumber-Explicit Bounds and Resonance-Free Regions*

J. Camaño, C. García, R. Oyarzúa: *Analysis of a Mixed FEM for Stationary Incompressible Magneto-Hydrodynamics*

[AUD-4] Mixed Finite Element Methods for Coupled and Nonlinear Problems (Part I) [S. Caucao, E. Colmenares]

S. Caucao, G. Gatica, F. Sandoval: *A Fully-Mixed Finite Element Method for the Coupling of the Navier–Stokes and Darcy–Forchheimer Equations*

R. Oyarzúa, M. Solano, P. Zúñiga: *A Priori and a Posteriori Error Analyses of a High Order Mixed-FEM for Stokes Flows on Curved Domains*

A. Allendes, F. Fuica, E. Otárola, D. Quero: *An AFEM for the Pointwise Tracking Optimal Control Problem of the Stokes Equations*

J. Camaño, C. García, R. Oyarzúa: *Analysis of a Conservative Mixed-FEM for the Stationary Navier–Stokes Problem*

13.00–15.00 L U N C H **[WHITE TENT]**

[AUD-1] Recent Advancements in Polygonal Methods (Part I) [L. Beirão da Veiga, L. Mascotto, D. Mora, G. Vacca]

L. Beirão da Veiga, F. Brezzi, L. D. Marini, A. Russo, G. Vacca: *The Virtual Element Method for Curved Polygons: State of the Art and Perspectives*

B. Cockburn, N.-C. Nguyen, J. Peraire, M. Sánchez: *Symplectic Hybridizable Discontinuous Galerkin Methods for Elastodynamics*

E. Artioli, A. Ortiz-Bernardin, R. Silva-Valenzuela, N. Sukumar: *The Virtual Element Decomposition: A New Paradigm for Developing Nodal Integration Schemes for Meshfree Galerkin Methods*

L. Beirão da Veiga, F. Dassi, A. Russo: *A C^1 Virtual Element Method on Polyhedral Meshes*

[AUD-2] Isogeometric Methods for PDE and Geometrical Problems (Part II) [E. Garau, P. Morin]

A. Chicco Ruiz, E. Garau, M. S. Pauletti: *IGA Method for Geometric Equations*

[AUD-2] Numerical Methods for Traffic Flow Problems (Part I) [P. Goatin, L. Villada]

R. Colombo: *Conservation Laws in Vehicular Traffic, Population Biology and Consensus Games*

E. Cristiani, E. Iacomini: *An Interface-Free Multi-Scale Multi-Order Model for Traffic Flow*

A. Festa, P. Goatin: *A Multi-Population Traffic Flow Model on Networks Accounting for On-Line Navigation Devices*

[AUD-3] Discontinuous Galerkin Approximations: Building Bridges Between Theory and Applications (Part I) [A. Cerfon, T. Sánchez-Vizuet]

A. Barrios, M. Solano: *A Hybridizable Discontinuous Galerkin Method for the Biharmonic Problem*

A. Cerfon, T. Sánchez-Vizuet, M. Solano: *Adaptive HDG for Semilinear Dirichlet Boundary Value Problems in Curved Domains*

S. Bertoluzza, G. Guidoboni, R. Hild, D. Prada, C. Prud'homme, R. Sacco, L. Sala, M. Szopos: *HDG Methods With Integral Boundary Conditions: Theory and Applications*

V. Calo, Q. Deng, S. Rojas: *Automatical Variationally Stable Finite Element Method: Strong Formulations*

[AUD-4] Numerical Approximation of Nonlocal and Fractional Problems (Part I) [E. Otárola, A. Salgado]

J. Shen: *Log Orthogonal Functions: Their Approximation Properties and Applications to Fractional Differential Equations*

H. Chen, M. Stynes: *A Higher-Order Method on a Fitted Mesh for Time-Fractional Initial-Value and Initial-Boundary Value Problems*

J. Borthagaray, W. Li, R. Nochetto: *Computation of Fractional Minimal Surfaces*

A. Rieder, J. Melenk: *Exponential Convergence of an hp-FEM Approximation for Parabolic Fractional Diffusion*

16.40–17.10 COFFEE BREAK **[WHITE TENT]**

[AUD-1] New Advances on Stabilized and Multiscale Numerical Methods (Part I) [E. Castillo, D. Paredes]

E. Castillo, R. Codina: *Dynamic Term-By-Term Stabilized Finite Element Formulation for Incompressible Flows*

M. Cruchaga, G. Buscaglia, R. Codina: *Pressure Enrichment for Bilinear Quadrilateral Finite Elements in Two-Fluid Flow Problems*

M. Storti, L. Garelli, A. Rodríguez, J. Dorella, M. Cruchaga: *An Eigenvalue Formulation for Heat Transfer in Periodic Geometries*

D. Barreiro, C. Faria, J. Filho: *Numerical Analysis for a Stabilized Hybrid Stabilized Primal Discontinuous Galerkin Method for the Heat Problem*

[AUD-2] WENO Schemes for Hyperbolic Conservation Laws (Part I) [C. Vega, D. Zorío]

G. Montecinos, D. Balsara: *A Novel Cell-Centered Polynomial Basis for the Predictor Steps in the Context ADER Finite Volume Schemes. The One-Dimensional Case*

R. Bürger, H. Torres, C. Vega: *An Entropy Stable Scheme for the Multiclass Lighthill–Whitham–Richards Traffic Model*

A. Baeza, R. Bürger, P. Mulet, D. Zorío: *Central WENO Schemes Through a Global Average Weight*

[AUD-3] Time-Evolution and Frequency-Domain Methods for Partial Differential Equations (Part I) [C. Pérez, D. Shirokoff]

P. Sepúlveda, D. Pardo: *A Spacetime Goal Oriented Adaptivity for an Explicit in Time Finite Element Method*

C. Ciuca, B. Cockburn, N.-C. Nguyen, J. Peraire, M. Sánchez: *Combining Discontinuous Galerkn Methods With Symplectic Time Integrators*

I. Labarca, C. Pérez-Arancibia, L. Faria: *Convolution Quadrature Methods for Time-Domain Scattering From Unbounded Penetrable Interfaces*

C. Pérez-Arancibia, C. Turc, L. Faria: *Density Interpolation Methods for Evaluation of Nearly-Singular, Weakly-Singular, and Hyper-Singular Boundary Integral Operators and Layer Potentials*

[AUD-4] Efficient Discretization of High-Dimensional Problems (Part I) [H. Harbrecht, C. Jerez-Hanckes]

H. Harbrecht, J. Tausch: *A Fast Sparse Grid Based Space-Time Boundary Element Method for the Heat Equation*

J. Dölz: *A Higher Order Perturbation Approach for Electromagnetic Scattering Problems on Random Domains*

R. Aylwin, C. Jerez-Hanckes, C. Schwab, J. Zech: *Computational Uncertainty Quantification for Electromagnetic Wave Scattering by Random Surfaces*

WEDNESDAY, JANUARY 23

09.00–09.50 PLENARY LECTURE **[AUD-0]** [*Chairman*: N. Heuer]

Helmut Harbrecht: *Wavelets Meet Boundary Integral Equations.*

09.55–10.45 PLENARY LECTURE **[AUD-0]** [*Chairman*: N. Heuer]

Jaime Peraire: *Computational (Nano) Photonics.*

10.50–11.20 COFFEE BREAK **[WHITE TENT]**

WEDNESDAY: **11.20–11.45 | 11.45–12.10 | 12.10–12.35 | 12.35–13.00** PARALLEL SESSIONS

[AUD-1] Robust Numerical Methods in Structural Mechanics and for Higher Order Problems (Part II) [T. Führer, N. Heuer, D. Praetorius]

W. Zulehner: *A New Approach to Mixed Methods for Reissner-Mindlin Plates and Shells*

T. Führer, N. Heuer, A. Niemi, F.-J. Sayas: *DPG for Plate Bending, Part I*

T. Führer, N. Heuer, A. Niemi, F.-J. Sayas: *DPG for Plate Bending, Part II*

T. Linss: *Maximum-Norm a Posteriori Error Estimates for Singularly Perturbed Fourth-Order Two-Point Boundary-Value Problems*

[AUD-2] WENO Schemes for Hyperbolic Conservation Laws (Part II) [C. Vega, D. Zorío]

A. Coronel, M. Sepúlveda: *Convergence of a Level-Set Algorithm for Scalar Conservation Laws*

A. Baeza, R. Bürger, P. Mulet, D. Zorío: *Efficient Third Order WENO Scheme With Unconditionally Optimal Accuracy Near Critical Points*

H. Carrillo, C. Parés: *Lax–Wendroff Type Reconstruction-Free High-Order Shock-Capturing Finite Difference Methods for Hyperbolic Conservation Laws*

H. Carrillo, E. Macca, G. Russo: *Local Smoothness Indicators*

[AUD-3] Time-Evolution and Frequency-Domain Methods for Partial Differential Equations (Part II) [C. Pérez, D. Shirokoff]

R. Pestourie: *Inverse Design of Large-Area Metasurfaces*

T. Anderson, O. Bruno, M. Lyon: *The "Fast Hybrid Method": Techniques for Efficient and Parallelizable, Dispersionless, High-Order Solution of Wave Scattering Problems*

R. Rosales, B. Seibold, D. Shirokoff, D. Zhou: *The Space Structure of Order Reduction in High-Order Runge–Kutta Methods for Initial Boundary Value Problems*

R. Rosales, B. Seibold, D. Shirokoff, D. Zhou: *Unconditional Stability for Multistep ImEx Schemes*

[AUD-4] Recent Developments in Immersed Boundary Methods [B. Sprinkle]

O. Maxian, A. Kassen, W. Strychalski: *A Continuous Energy-Based Immersed Boundary Method for Elastic Shells*

C. Puelz, M. Smith, S. Rossi, D. Wells, B. Griffith: *Hyperelastic Immersed Boundary Finite Element Model of a Human Heart*

B. Sprinkle, A. Bhalla, A. Donev, N. Patankar: *Immersed Boundary Methods for Rigid-Particle Suspensions*

B. Griffith, E. Kolahdouz, C. Puelz: *Sharp Interface Immersed Boundary Methods for Fluid-Structure Interaction*

13.00–13.10 OFFICIAL PHOTO **[in front of the EMPREUDEC BUILDING]**

13.10–15.00 L U N C H **[WHITE TENT]**

[AUD-1] New Advances on Stabilized and Multiscale Numerical Methods (Part II) [E. Castillo, D. Paredes]

R. Almeida, I. Santos, S. Malta, A. Valli, L. Catabriga: *Convergence Analysis for the Dynamic Diffusion Method Applied to Advection-Diffusion-Reaction Problems*

A. Allendes, G. Barrenechea, C. Naranjo, J. Novo: *Low-Order Divergence-Free Finite Element Methods in Fluid Mechanics*

D. Paredes, F. Valentin: *New Advances on Multiscale Hybrid-Mixed Methods*

W. Pereira, F. Valentin: *A New Multiscale Finite Element Method for Elastic Wave Propagation*

[AUD-2] Uncertainty Quantification and Applications (Part I) [A. Barth, I. Kröker]

C. Bauzet, V. Castel, J. Charrier: *Well-Posedness Result for an Hyperbolic Scalar Conservation Law With a Stochastic Force Using a Finite Volume Approximation*

H. Grillmeier, G. Grün: *Free Boundary Propagation Under the Impact of Noise: A Numerical Study Based on Convergent Finite-Element Schemes*

M. Petrella, S. Tokareva, E. Toro: *Uncertainty Quantification Methodology for Hyperbolic Systems With Application to Blood Flow in Arteries.*

R. Bürger, I. Kröker: *Uncertainty Quantification for Strongly Degenerate Parabolic Equations Modelling Sedimentation*

[AUD-3] Computational Electromagnetism (Part II) [A. Bermúdez, R. Rodriguez, P. Venegas]

A. Alonso-Rodríguez, F. Rapetti: *Graph Techniques for High Order Discrete Potentials*

P. Devloo, H. Hernandez-Figueroa, F. Orlandini: *High Order* $\mathbf{H}(curl)$*-Conforming Approximation Spaces in Curved Meshes for Photonic Waveguide Analysis*

C. Jerez-Hanckes, J. Pinto: *High-Order Galerkin Method for Helmholtz and Laplace Problems on Multiple Open Arcs*

J. Del Ser, A. Galdrán, D. Pardo, A. Picón, M. Shahriari, C. Torres-Verdín: *Inversion of Borehole Resistivity Measurements Using Deep Learning*

[AUD-4] Numerical Approximation of Nonlocal and Fractional Problems (Part II) [E. Otárola, A. Salgado]

G. Acosta, F. Bersetche: *Finite Element Method for a Time-Space Fractional Allen–Cahn Equation*

M. Ainsworth, C. Glusa: *Hybrid Finite Element - Spectral Method for the Fractional Laplacian: Approximation Theory and Efficient Solver*

A. Bonito, W. Lei, A. Salgado: *A Finite Element Approximation of an Obstacle Problem for a Class of Integro–Differential Operators*

N. Cusimano, F. del Teso, L. Gerardo-Giorda: *Numerical Approximation of the Spectral Fractional Laplacian on Bounded Domains*

16.40–17.10 COFFEE BREAK [**WHITE TENT**]

[AUD-1] Recent Advancements in Polygonal Methods (Part II) [L. Beirão da Veiga, L. Mascotto, D. Mora, G. Vacca]

L. Mascotto, I. Perugia, A. Pichler: *Nonconforming Trefftz Virtual Element Method for the Helmholtz Problem*

G. Barrenechea, F. Jaillet, D. Paredes, F. Valentin: *The Multiscale Hybrid-Mixed Finite Element Method in Polygonal Meshes*

F. Gardini, G. Manzini, G. Vacca: *Conforming and Nonconforming Virtual Element Methods for Elliptic Eigenvalue Problems*

S. Bertoluzza, D. Prada: *A Polygonal Discontinuous Galerkin Method With Minus One Stabilization*

[AUD-2] Uncertainty Quantification and Applications (Part II) [A. Barth, I. Kröker]

J. Giesselmann, F. Meyer, C. Rohde: *A Posteriori Error Analysis for Random Conservation Laws*

M. Frank, J. Kusch, R. McClarren: *A Filtered Stochastic Galerkin Method for Hyperbolic Equations*

F. Meyer, L. Schlachter, F. Schneider: *Hyperbolicity-Preserving Stochastic Galerkin Schemes for Uncertain Hyperbolic Systems of Equations*

[AUD-2] Session of Communications (Part I) [L. Figueroa]

R. Bürger, R. Ordoñez, M. Sepúlveda, L. Villada: *A Finite Volume Scheme for a Parabolic-Elliptic Problem*

[AUD-3] Discontinuous Galerkin Approximations: Building Bridges Between Theory and Applications (Part II) [A. Cerfon, T. Sánchez-Vizuet]

R. Araya, M. Solano, P. Vega: *A Posteriori Error Analysis of HDG Methods in Fluid Mechanics*

M. Giacomini, R. Sevilla, A. Huerta: *Hybridizable Discontinuous Galerkin Formulation Based on Voigt Notation for Computational Mechanics*

J. Muñoz-Matute, D. Pardo, V. Calo, E. Alberdi: *Time-Discontinuous Petrov-Galerkin Methods for the Advection-Diffusion Equation*

A. Hakim: ***[CANCELLED]***

[AUD-4] Conforming and Non-Conforming Methods for Waves (Part I) [L.-M. Imbert, F.-J. Sayas]

L. Mascotto, A. Pichler: *A Nonconforming Trefftz Virtual Element Method for the Fluid-Fluid Interface Problem*

P. Sepúlveda, J. Gopalakrishnan: *A Spacetime DPG Method for the Wave Equation in Multiple Dimensions*

G. Sylvand: *H-Matrix Solver Applied to Coupled FEM-BEM Aeroacoustics Simulations*

H. Eruslu, F.-J. Sayas: *Full Discretization of a Gallery of Wave Propagation Models on Viscoelastic Solids*

THURSDAY, JANUARY 24

09.00–09.50 PLENARY LECTURE **[AUD-0]** [*Chairman*: Rodolfo Rodríguez]

Erik Burman: *Ill-Posed Problems and Stabilized Finite Element Methods.*

09.55–10.45 PLENARY LECTURE **[AUD-0]** [*Chairman*: Rodolfo Rodríguez]

Lourenço Beirão da Veiga: *An Introduction to Virtual Elements in 3D.*

10.50–11.20 COFFEE BREAK **[WHITE TENT]**

[AUD-1] Robust Numerical Methods in Structural Mechanics and for Higher Order Problems (Part III) [T. Führer, N. Heuer, D. Praetorius]

G. Gantner, A. Haberl, D. Praetorius, S. Schimanko: *Rate Optimal Adaptive FEM With Inexact Solver for Nonlinear Operators*

C.-M. Pfeiler, D. Praetorius: *Dörfler Marking With Minimal Cardinality Is a Linear Complexity Problem*

P. Daniel, A. Ern, I. Smears, M. Vohralík: *An Adaptive hp–Refinement Strategy With Inexact Solvers and Computable Guaranteed Bound on the Error Reduction Factor*

A. Ern, T. Gudi, I. Smears, M. Vohralík: *Equivalence of Local-And Global-Best Approximations and Simple Stable Local Commuting Projectors in* $\boldsymbol{H}(\mathrm{div}, \Omega)$

[AUD-2] Numerical Methods for Water Resources (Part I) [F. Betancourt, S. Diehl, M. del Carmen Martí]

R. Bürger, E. Fernández-Nieto, V. Osores: *A Multilayer Shallow Water Model for Polydisperse Sedimentation With Sediment Compressibility Mixture Viscosity*

A. Alvarado, J. Cisneros, I. Nopens, U. Rehman: ***[CANCELLED]***

F. Betancourt, A. García: *A Conservative Mathematical Model and Numerical Solution of the Centrifugal Settling With Coalescence of Liquid-Liquid Dispersions*

F. Betancourt, A. Pereira, D. Sbárbaro, F. Concha: *Control Strategies for Clarifier-Thickeners Units*

[AUD-3] Discontinuous Galerkin Approximations: Building Bridges Between Theory and Applications (Part III) [A. Cerfon, T. Sánchez-Vizuet]

W. Qiu, K. Shi: *A Mixed DG Method and an HDG Method for Incompressible Magnetohydrodynamics*

M. Bohm, A. Winters, G. Gassner, D. Derigs, F. Hindenlang: *An Entropy Stable Nodal Discontinuous Galerkin Method for the Resistive MHD Equations*

C. Michoski, F. Waelbroeck, J. Evans, A. Samii, L. Engvall, Y.-S. Kwon, A. Hakim, J. Chan: ***[CANCELLED]***

C. Ciuca, P. Fernandez, A. Christophe, N.-C. Nguyen, J. Peraire: *Implicit Hybridized Discontinuous Galerkin Methods for Compressible Magnetohydrodynamics*

[AUD-4] Conforming and Non-Conforming Methods for Waves (Part II) [L.-M. Imbert, F.-J. Sayas]

S. Du, F.-J. Sayas: *HDG for Transient Elastic Waves*

I. Graham, O. Pembery, E. Spence: *Nearby Preconditioning for Multiple Realisations of the Helmholtz Equation*

J. Kaye, L. Greengard: *Transparent Boundary Conditions for the Time-Dependent Schrödinger Equation With a Uniform Applied Field*

P. Joly, M. Kachanovska, A. Semin: *Transparent Boundary Conditions for the Wave Propagation in Fractal Trees*

13.00–15.00 L U N C H **[WHITE TENT]**

[AUD-1] Recent Advancements in Polygonal Methods (Part III) [L. Beirão da Veiga, L. Mascotto, D. Mora, G. Vacca]

K. Cascavita, F. Chouly, A. Ern: *Hybrid High-Order Methods for Signorini's Unilateral Contact Problem*

S. Chandler-Wilde, D. Hewett, A. Moiola: *Scattering by Fractal Screens: Functional Analysis and Computation*

E. Artioli, E. Olate-Sanzana, A. Ortiz-Bernardin: *Modeling Poisson Equations With Strong Localized Source Terms Using the Virtual Element Method With Extrinsic Enrichment*

D. Mora, I. Velásquez: *A Virtual Element Method for the Transmission Eigenvalue Problem*

[AUD-2] Numerical Methods for Traffic Flow Problems (Part II) [P. Goatin, L. Villada]

C. Chalons: *In-Cell Discontinuous Reconstructions for the Computation of Nonclassical/Nonconservative Shocks. Application to the Traffic Flow Modelling*

M. L. Delle Monache, T. Liard, B. Piccoli, R. Stern, D. Work: *Traffic Reconstruction Using Autonomous Vehicles*

R. Bürger, D. Inzunza, P. Mulet, L. Villada: *An IMEX-RK Schemes for Nonlocal Equations With a Gradient Flow Structure in 1D*

F. Chiarello, L. Villada, P. Goatin: *High Order Finite-Volume WENO Schemes for Non-Local Traffic Flow Models*

[AUD-3] Computational Electromagnetism (Part III) [A. Bermúdez, R. Rodriguez, P. Venegas]

X. Claeys, F. Collino, P. Joly, E. Parolin: *Non Overlapping Domain Decomposition Methods With Non Local Transmission Conditions for Electromagnetic Wave Propagation*

V. Calo, D. Garcia, D. Pardo: *Refined Isogeometric Analysis (rIGA) for Electromagnetics*

S. Fliss: *The Halfspace Matching Method : A New Method to Solve Scattering Problem in Complex Media*

P. Ciarlet, M. Kachanovska: *Wave Propagation in Hyperbolic Metamaterials: Frequency Domain*

[AUD-4] Numerical Approximation of Nonlocal and Fractional Problems (Part III) [E. Otárola, A. Salgado]

C. Mejía, A. Piedrahita: *Numerical Solution of Time Fractional Advection-Dispersion Equations*

M. Faustmann, J. Melenk, M. Parvizi, D. Praetorius: *Optimal Adaptivity and Preconditioning for the Fractional Laplacian*

H. Gimperlein, J. Stocek: *Space-Time Adaptive Finite Elements for Nonlocal Parabolic Variational Inequalities*

M. Karkulik, J. Melenk: *The Inverse of a Finite Element Discretization of the Fractional Laplacian Can Be Approximated by $\mathcal{H}$-Matrices*

16.40–17.10 COFFEE BREAK [**WHITE TENT**]

[AUD-1] Recent Advancements in Polygonal Methods (Part IV) [L. Beirão da Veiga, L. Mascotto, D. Mora, G. Vacca]

V. Anaya, M. Bendahmane, D. Mora, M. Sepúlveda: *A Virtual Element Method for a Nonlocal FitzHugh–Nagumo Model of Cardiac Electrophysiology*

[AUD-1] New Advances on Stabilized and Multiscale Numerical Methods (Part III) [E. Castillo, D. Paredes]

O. Durán, P. Devloo, S. Gomes: *A Multiscale Hybrid Method Using Mixed Finite Elements for Two-Phase Flow Considering Gravity Effects*

R. Araya, C. Bertoglio, C. Cárcamo, A. Poza, F. Valentin: *Multiscale Hybrid-Mixed Method for the Oseen Equation*

R. Araya, R. Rebolledo, F. Valentin: *On a Multiscale a Posteriori Error Estimator for the Stokes and Brinkman Equations*

[AUD-2] Session of Communications (Part II) [L. Figueroa]

J. Gallo-Molina, K. Lesage, I. Nopens: *The Application of Population Balance Models for the Prediction of Rheological Properties in Fresh Cement Pastes*

C. Torres-Ulloa, S. Berres, P. Grassia: *Foam-Liquid Front Motion in Eulerian Coordinates*

C. Escalante, E. Fernández-Nieto, T. Morales de Luna, M. Castro: *An Efficient Non-Hydrostatic Approach for Dispersive Water Waves*

A. Coronel, I. Hess: *On the Numerical Solution of Dual-Phase-Lagging Equation in a Multilayered Nanoscale Solid*

[AUD-3] Computational Electromagnetism (Part IV) [A. Bermúdez, R. Rodriguez, P. Venegas]

J.-F. Fritsch, L.-M. Imbert-Gérard: *Wave Propagation in Inhomogeneous Media: Generalized Plane Waves for Maxwell's Equations*

[AUD-3] Efficient Discretization of High-Dimensional Problems (Part II) [H. Harbrecht, C. Jerez-Hanckes]

F. Henríquez, C. Schwab: *Shape Holomorphy of the Boundary Integral Operators in Acoustic Wave Scattering: Applications to Forward and Inverse Uncertainty Quantification*

H. Harbrecht, M. Multerer, M. Schmidlin: *Uncertainty Quantification for Elliptic PDEs With Random Anisotropic Diffusion*

P. Escapil-Inchauspé, C. Jerez-Hanckes: *Wave Diffraction by Random Surfaces: Uncertainty Quantification via Sparse Tensor Boundary Elements and Shape Calculus*

[AUD-4] Mixed Finite Element Methods for Coupled and Nonlinear Problems (Part II) [S. Caucao, E. Colmenares]

S. Kumar, R. Oyarzúa, R. Ruiz-Baier, R. Sandilya: *Conservative Discontinuous Finite Volume and Mixed Schemes for a New Four-Field Formulation in Poroelasticity*

M. Alvarez, G. Gatica, B. Gomez-Vargas, R. Ruiz-Baier: *New Mixed Finite Element Methods for Natural Convection With Phase-Change in Porous Media*

M. Alvarez, E. Colmenares, F. Sequeira: *On a Mixed Method for the Oberbeck-Boussinesq Model of Heat and Mass Transfer*

THURSDAY, JANUARY 24 / EVENING

20.30 CONFERENCE DINNER
[HACIENDA PATAGONIA]

*At **19.30 hrs.** there will be four buses waiting in front of the* EMPREUDEC BUILDING. *They will leave to **Hacienda Patagonia** at **20.00 hrs.***

Please, notice that:

- *those people* **not planning** *to attend,*
- *those people planning to attend that are* **vegetarians**,
- *and the* **accompanying persons** *who also plan to attend,*

should let us know at the Conference Secretariat no later than **Monday, January 21.**

FRIDAY, JANUARY 25

09.00–09.50 PLENARY LECTURE **[AUD-0]** [*Chairman*: R. Oyarzúa]

Enrique D. Fernández Nieto: *Layer-Averaged Approximations for Free Surface Flows: Fluids, Landslides and Sediment Transport.*

09.55–10.45 PLENARY LECTURE **[AUD-0]** [*Chairman*: R. Oyarzúa]

Snorre H. Christiansen: *Finite Element Complexes for the Stokes Equation.*

10.50–11.20 COFFEE BREAK **[WHITE TENT]**

[AUD-1] Robust Numerical Methods in Structural Mechanics and for Higher Order Problems (Part IV) [T. Führer, N. Heuer, D. Praetorius]

P. Cantin, N. Heuer: *A dPG Framework for Monotone Operators*

M. Feischl, T. Tran: *Regularity of Solutions and Convergence of Time-Stepping for the Landau-Lifshitz-Gilbert Equation*

J. Bohn, M. Feischl: *A Convergent Linear Finite Element Scheme for Scattered Maxwell–Landau–Lifshitz–Gilbert Equations*

F. Millar, I. Muga, D. Paredes, K. Van der Zee: *Projection in Negative Norms and the Regularization of Rough Linear Functionals*

[AUD-2] Numerical Methods for Water Resources (Part II) [F. Betancourt, S. Diehl, M. del Carmen Martí]

R. Bürger, S. Diehl, M. C. Martí: *Flotation With Sedimentation I: Models With Systems of Conservation Laws With Discontinuous Flux*

R. Bürger, S. Diehl, M. C. Martí: *Flotation With Sedimentation II: Numerical Solution and Characterization of Stationary Solutions*

B. De Jaegher, W. De Schepper, I. Nopens, A. Verliefde: *Modelling of Underlimiting and Overlimiting Current Transport in Electrodialysis: Challenges and Opportunities*

R. Bürger, J. Careaga, S. Diehl, R. Ruiz-Baier: *Numerical Simulations of Sedimentation in Axisymmetric Vessels*

[AUD-3] Session of Communications (Part III) [L. Figueroa]

S. Domínguez, N. Nigam: *The Jones Eigenproblem in Linear Elasticity*

M. Cavalcanti, W. Corrêa, M. Cortés, R. Véjar Asem: *Finite Difference Scheme for the High Order Nonlinear Schrödinger Equation With Localized Dissipation*

A. Coronel, A. Tello, M. Sepúlveda: *On the Analytical Solution of the Riemann Problem for a Scalar Balance Law With a Non-Convex Flux and Discontinuous Source Term*

A. Habbal, M. Kallel, M. Ouni: *Nash Strategies for Cauchy-Stokes Shape Identification Problems*

13.00–15.00 L U N C H **[WHITE TENT]**

FRIDAY: **15.00–15.25 | 15.25–15.50** PARALLEL SESSIONS

[AUD-1] Robust Numerical Methods in Structural Mechanics and for Higher Order Problems (Part V) [T. Führer, N. Heuer, D. Praetorius]

M. Bernkopf, J. Melenk: ***[CANCELLED]***

T. Führer, M. Karkulik: ***[CANCELLED]***

[Moved to AUD-1] Mixed Finite Element Methods for Coupled and Nonlinear Problems (Part III) [S. Caucao, E. Colmenares]

R. Bürger, P. Méndez, R. Ruiz-Baier: *On $\boldsymbol{H}$(div)-Conforming Methods for Double-Diffusion Equations in Porous Media*

A. Allendes, G. Barrenechea, C. Naranjo, E. Otárola: *Stabilized Finite Element Approximation for a Generalized Boussinesq Problem: A Posteriori Error Analysis*

[AUD-3] Session of Communications (Part IV) [L. Figueroa]

G. Benavides, L. Figueroa: *Orthogonal Projection on Polynomials and Sobolev-Like Spaces With Reflection-Invariant Weights*

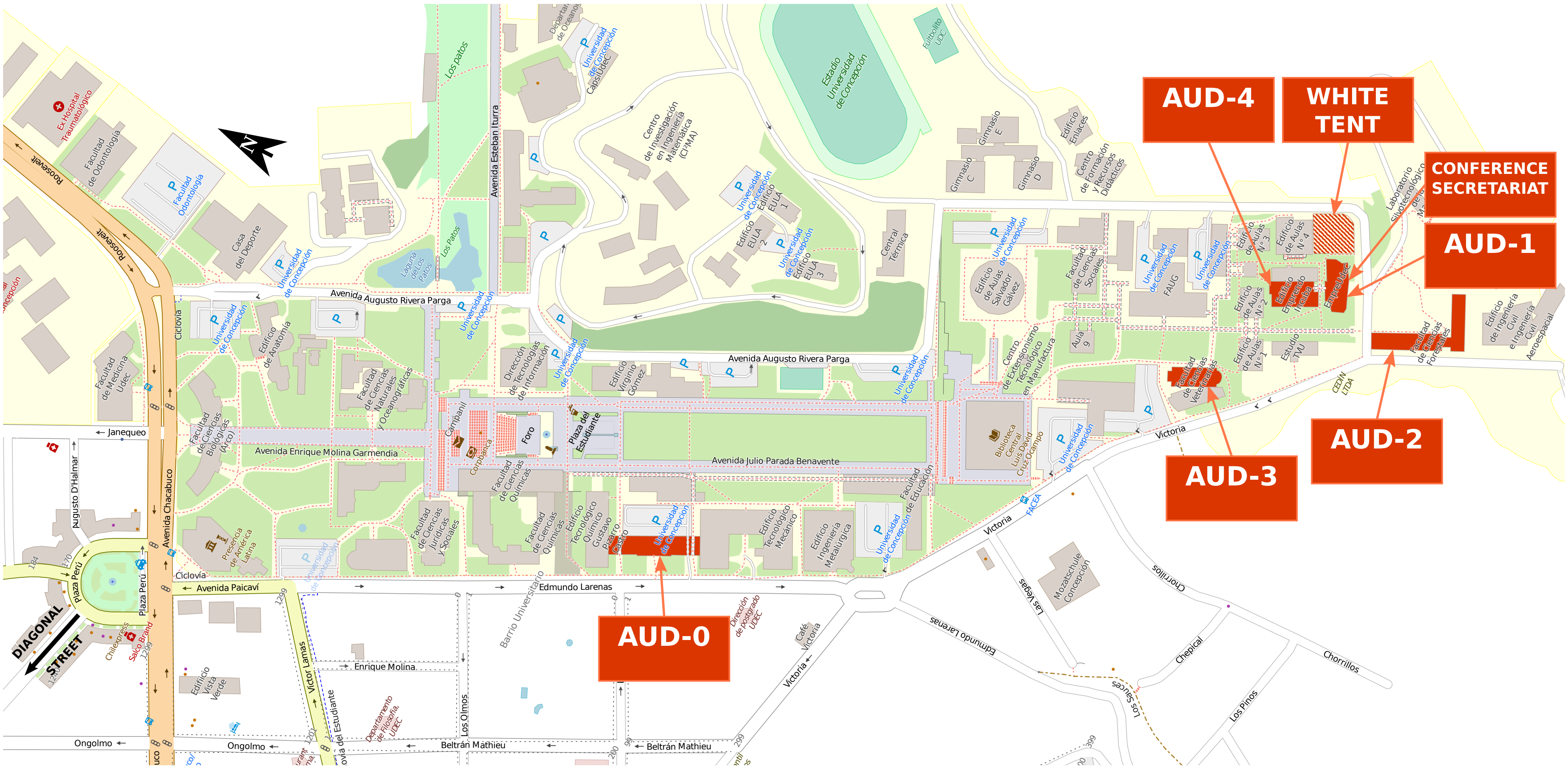
L. Figueroa: *High-Order Sobolev Orthogonal Polynomials, Approximation Theory and Spectral Methods in the Ball*

15.50–16.40 CLOSING PLENARY LECTURE **[AUD-1]** [*Chairman*: L. Figueroa]

Angela Kunoth: *Optimal Wavelet Solvers for Control Problems Constrained by Evolution PDEs.*

16.40–17.10 COFFEE BREAK **[WHITE TENT]**

CAMPUS MAP


AUD-4
WHITE TENT
CONFERENCE SECRETARIAT
AUD-1
AUD-2
AUD-3
AUD-0
DIAGONAL STREET
N
Avenida Augusto Rivera Parga
Avenida Enrique Molina Garmendia
Avenida Julio Parada Benavente
Avenida Chacabuco
Avenida Paicaví
Avenida Esteban Iturra
Edmundo Larenas
Victoria
Chorrillos
Beltrán Mathieu
Ongolmo
Enrique Molina
Los Olmos
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Campanil
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Laguna de Los Patos
Los patos
Roosevelt
Plaza Perú
Janequeo
Ciclovía
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Casa del Deporte
Ex Hospital Traumatológico
Facultad de Medicina Udec
Edificio de Anatomía
Facultad de Ciencias Biológicas (Arco)
Facultad de Ciencias Naturales y Oceanográficas
Facultad de Ciencias Químicas
Facultad de Ciencias Jurídicas y Sociales
Facultad de Educación
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