SMART 2025

4th International Conference on
Subdivision, Geometric and Algebraic **M**ethods,
Isogeometric **A**nalysis and **R**efinability in I**T**aly

Reggio Calabria, Italy, September 28–October 2, 2025

SCIENTIFIC PROGRAM

Sunday, September 28	
15:00–17.30	Registration
17:30–18:30	Welcome Reception & Scientific Kick-off
20:00	*Dinner*

Monday, September 29		
8:40–8:50	*Conference opening*	
8:50–9:40	**Deepesh Toshniwal (Filicudi room):** Adaptive FEEC with hierarchical splines	
	Contributed Session 1 (Filicudi room)	**Contributed Session 2 (Alicudi room)**
9:40–10:05	Michelangelo Marsala: Hierarchical Biquadratic Splines with almost C^1 continuity for Isogemetric Analysis simulations	Philipp Langgruber: Subdivision for Splines on Vertex Stars
10:05–10:30	Aljaž Kosmač: Isogeometric collocation with smooth mixed degree splines over planar multi-patch domains	Rune Dalmo: Wavelet-based non-parametric estimation of self-similar fractals
10:30–11:00	*Coffee break*	
11:00–11:25	Matija Šteblaj: New approach for constructing edge B-spline-like basis functions for C^1 and C^2 splines over triangulations	Krassimira Vlachkova: Testing tensor product Bézier surfaces for coincidence
11:25–11:50	Tatiana Kravetc: Trivariate blending type spline constructions in isogeometric applications	Chiara Romanengo: Recognition of geometric primitives from point clouds for buildings' reconstruction
11:50–12:15	Ada Šadl Praprotnik: Construction of rational C^1 cubic Powell Sabin splines	Nadaniela Egidi: Curves approximation based on inverse multiquadric radial basis functions
12:15–12:40	Robert Piel: Towards hierarchically refinable spline complexes for adaptive simulations on irregular triangulations	Rosario Corso: Hermite-type sampling operator
12:40–14:10	*Lunch*	
14:10–15:00	**Jungho Yoon (Filicudi room):** Quasi-interpolatory subdivision schemes generalizing the cubic B-spline and fourth-point schemes	
	MS1 (Carla Manni): Advances in spline technologies and their applications (Filicudi room)	**MS2 (Tomas Sauer): Signal processing by Multiresolution And Related Topics (SMART) (Alicudi room)**
15:00–15:25	Francesca Mazzia: B-spline Hermite Quasi Interpolants: from Differential Equations Dense Output to Data Mining Applications	Kathrin Schiermeier: Multidimensional Scaling Functions and Scaling Filters with arbitrary Scaling Matrices
15:25–15:50	Alessandra Aimi: Spline quasi- and quasi^2- interpolating projectors for the numerical solution of Cauchy singular Fredholm integral equations	Gerlind Plonka: ESPIRA: Estimation of Signal Parameters by Iterative Rational Approximation
15:50–16:20	*Coffee break*	
16:20–16:45	Tadej Kanduč: Numerical integration of nearly singular integrals in 2D IGA-BEM	Demetrio Labate: Efficient Clustering on Riemannian Manifolds by Fréchet Mappings
16:45–17:10	Cesare Bracco: A smoothly varying quadrature technique for IgABEM in Stokes flow simulations	Dörte Rüweler: Notes on Polynomials with falling and raising factorials
17:10–17:35	Oleg Davydov: Error bounds for numerical differentiation with polyharmonic radial basis functions	Brigitte Forster-Heinlein: Rebricking frames and bases
17:35–18:00	Emil Žagar: Application of a metric for complex polynomials to bounded modification of planar Pythagorean hodograph curves:	Rosanna Campagna: Regularization Methods for Planar Offset Curves
20:00	*Dinner*	

Tuesday, September 30		
8:50–9:40	**Marjeta Knez (Filicudi room):** On Pythagorean-hodograph curves and their applications	
	MS3 (Hendrik Speleers): Isogeometric Analysis (Filicudi room)	**MS4 (Vittoria Bruni–Damiana Lazzaro): New Trends in Data Processing and Machine Learning (Alicudi room)**
9:40–10:05	Tom Lyche: A positive partition of unity basis for the Alfeld split	Domenico Vitulano: To what extent do Convolutional Neural Networks incorporate the wavelet formalism?
10:05–10:30	Jan Grošelj: Rational Powell Sabin B-splines in isogeometric methods	Paolo Angella: Diffusing Motion Artifacts for unsupervised correction in brain MRI images
10:30–11:00	*Coffee break*	
11:00–11:25	Carla Manni: Isogeometric discrete differential forms with Tchebycheffian B-splines	Antonio Cicone: Non-stationary signal decomposition via deep learning techniques, the IRCNN algorithm
11:25–11:50	Ye Ji: Analysis-suitable parameterization for isogeometric analysis	Paolo Zuzolo: Geometric methods for analyzing macro-, meso- and micro-structure of textile surfaces
11:50–12:15	Fatima Hasanova: Isogeometric multigrid methods for G^1 multi-patch domains	Paola Erminia Calabrese: Neural Network design for the selection of the optimal HP-Spline frequency parameter
12:15–12:40	Hugo M. Verhelst: Adaptive Isogeometric Analysis for Volumetric Phase-Field Simulations with Application to Brittle Fracture: Recent Advances and Challenges	
12:40–14:10	*Lunch*	
14:10–15:00	**Stefano De Marchi (Filicudi room):** Persistent homology applications in data analysis	
	Contributed Session 3 (Filicudi room)	**Contributed Session 4 (Alicudi room)**
15:00–15:25	Ming-Jun Lai: A Bivariate Spline Construction of Orthonormal Polynomials over Polygonal Domains and Its Applications to Quadratures	Anahita Riahi: Image Reconstruction from Undersampled Fourier Data
15:25–15:50	Yuri Caridi: Quadrature rules based on second-order Bernstein-like operators	Yannick Riebe: The Multichannel Blind Deconvolution Problem in Parallel MRI
15:50–16:20	*Coffee break*	
16:20–16:45	Hwan Pyo Moon: Approximation methods for high degree polynomial surfaces using Gauss Legendre basis	Peter Binev: On Autoencoders and Sparse Representation of Patterns
16:45–17:10	Jana Vráblíková: Approximating envelopes of evolving planar domains by arc splines	Vincent Guillemet: Mixed Derivatives Total Variation
17:10–17:35	Alberto Viscardi: Planar PH curves in generalized polynomial spaces of order 4 and 6	Rosa Donat: Multiresolution techniques in Large Scale Optimization problems
20:00	*Social Dinner*	

Wednesday, October 1		
8:50–9:40	**Annie Cuyt (Filicudi room):** Sparse Interpolation and Exponential Analysis	
	MS5 (Emil Žagar): CAGD in a SMART way (Filicudi room)	**MS6 (Domingo Barrera): Spline Approximation and Applications (Alicudi room)**
9:40–10:05	Carolina Beccari: Noisy Data Approximation Using Pythagorean-Hodograph B-Spline Curves	Francesco Dell'Accio: On the localization of the multinode Shepard interpolation formula
10:05–10:30	Kai Hormann: The barycentric form of rational Bézier curves	Salah Eddargani: Quadrature rules for smooth multivariate splines
10:30–11:00	*Coffee break*	
11:00–11:25	Filip Chudy: Fast subdivision of Bézier curves	Federico Nudo: Enrichment strategy for the standard triangular and simplicial linear finite element
11:25–11:50	Tomas Sauer: Quaternion Curves for Pose Control	Krunal Raval: Quasi-Conformal Surface Parameterization via Deep Learning
11:50–12:15	Tina Bosner: Interpolation and quasi-interpolation by CCC splines	Michael Barton: Smooth surface finishing for 5-axis flank CNC machining of freeform geometries using custom-shaped tools
12:15–12:40	Aleš Vavpetič: Optimal uniform parabolic approximation	
12:40–14:10	*Lunch*	
14:10–15:00	**Daniela Giorgi (Filicudi room):** When design meets reuse: Geometric and structural adaptation of grid shells via differentiable optimization and geometric deep learning	
15:00	*Excursion*	
20:00	*Dinner*	

Thursday, October 2		
	Contributed Session 5 (Filicudi room)	**Contributed Session 6 (Alicudi room)**
8:50–9:15	Dany Leviatan: Shape preserving approximation by trigonometric polynomials	Janina Schmidt: Mathematical Modeling and Automated Adjustment of the Focusing Optics in Free-electron Lasers
9:15–9:40	Dag Nylund: Spline curves on tensor product surfaces	Francesco Larosa: Reconstruction of discontinuous functions via integral data and multinode Shepard functions
9:40–10:05	Borre Bang: Expo-Rational B-spline volumes	Bruno Degli Esposti: A decoupled meshless Nyström scheme for 2D Fredholm integral equations of the 2nd kind with smooth kernels
10:05–10:30	Juan Ruiz-Álvarez: Exploring nonlinear approaches to quasi-interpolation: techniques and analysis	Chiara Sorgentone: Boundary Integral Methods on Irregular Domains
10:30–11:00	*Coffee break*	
11:00–11:25	Dionisio F. Yáñez: Non-linear Moving Least Squares	Joachim Jørgensen Ågotnes: An End-to-End Pipeline for Bézier-Compatible 3D Printing from NURBS Geometry
11:25–11:50	Yejin Kim: Nearly interpolating monotonicity preserving C^1 subdivision scheme with the third-order accuracy	Tanja Henriksen: A direct slicing approach for additive manufacturing
11:50–12:15	*Conference closure*	
12:15–14:10	*Lunch*	