Martin Huska, PhD.

Curriculum Vitae

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Personal Data

Birth	April 23, 1991
Citizenship	Slovak
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Research Interests

Numerical analysis, Geometry and Image Processing, Shape Analysis, Sparse Reconstruction, Variational methods, Numerical Optimization

Postdoctoral Fellowships

Feb. 2022 – Jan. 2023 **Post-Doc Fellowship**, *University of Bologna, Department of Mathematics*, Bologna, Italy,
Research grant "Variational approaches and numerical optimization to signal and image decomposition.
Supervisor: Prof. Serena Morigi

Dec. 2020 – Nov. 2021 **Post-Doc Fellowship**, *University of Bologna*, Bologna, Italy,
Research grant "DIG-ITAL-PEN – SPIN-OFF UNIBO – CUP J34I19003100002" .
Supervisor: Prof. Isabella Baldini

Dec. 2019 – Nov. 2020 **Post-Doc Fellowship**, *University of Bologna, Department of Mathematics*, Bologna, Italy,
Research grant "Sparse-inducing shape decomposition and reconstruction".
Supervisor: Prof. Serena Morigi

Jan 2019 – Apr 2019 **Visiting Post-Doc**, *School of Mathematics, Georgia Institute of Technology*, Atlanta, Georgia, USA,
Marco Polo scholarship for mobility of young researchers.
Local supervisor: Prof. Sung Ha Kang

Dec. 2018 – Nov. 2019 **Post-Doc Fellowship**, *University of Bologna, Department of Mathematics*, Bologna, Italy,
Research grant "Sparsity-based shape decomposition and shape analysis".
Supervisor: Prof. Serena Morigi

Dec. 2017 – Nov. 2018 **Post-Doc Fellowship**, *University of Bologna, Department of Mathematics*, Bologna, Italy,
Research grant "Sparse reconstruction and shape analysis".
Supervisor: Prof. Serena Morigi

Industrial Collaboration Research

Dec. 2021 – Jan. 2022 **Principal Investigator**, *Ortho Evolution S.R.L.*, Oggiono, Italy,
Project Title: Gum Morphing.
Software solution for 3D modelling in dental apparatus design

Active/Recent National and International Collaborations

- Sung Ha Kang, Georgia Institute of Technology, Atlanta, Georgia, USA
- Antonio Cicone, University of L'Aquila, L'Aquila, Italy
- Ivan Selesnick, New York University, Brooklyn, New York, USA
- Karol Mikula, Slovak University of Technology, Bratislava, Slovakia

Education

Nov. 2014 – Oct. 2017 **Università Degli Studi di Padova**, *Padua, Italy*, PhD (XXX. cycle).

Title PhD in Mathematical Sciences, Curriculum Computational Mathematics, Diploma no. 1809046.F2.229721 from March 1, 2018

PhD thesis Variational Methods and Numerical Algorithms in Geometry Processing
Supervisor: Prof. Serena Morigi, University of Bologna

Sep. 2012 – June 2014 **Slovak University of Technology**, *Bratislava, Slovakia*, Applied Mathematics (Master's level), Study Program: Mathematical and Computational Modeling.
Specialization in Applied Mathematics with a focus on computer modelling and modern methods of applied mathematics (numerical, statistical, optimization, graphics and visualization methods and software)

Title Master in Applied Mathematics, Diploma no. SvF-14-5343-67644 from June 17, 2014, The Diploma Supplement 120 ECTS (European Credit Transfer System)
State Examination in the subject *Numerical Methods in Mathematical and Computational Modeling* passed with the grade A(excellent)/{A–Fx},
State Examination in the subject *Stochastic and Optimization Methods* passed with the grade A(excellent)/{A–Fx}

Master thesis Lagrangian Numerical Algorithms for Surface Evolution with Topological Changes, Supervisor: Prof. Mariana Remešíková,
Master Thesis defended with the grade A(excellent)/{A–Fx}

Sep. 2009 – June 2012 **Slovak University of Technology**, *Bratislava, Slovakia*, Applied Mathematics (Bachelor's level), Study Program: Mathematical and Computational Modeling.

Title Bachelor in Applied Mathematics, Diploma no. SvF-12-5342-67644 from June 26, 2012
State Examination in the subject *Methods of Mathematical and Computational Modeling* passed with the grade A(excellent)/{A–Fx}

Bachelor thesis Design and Visualization of Steel Cable Constructions,
Supervisor: Prof. Mariana Remešíková
Bachelor Thesis defended with the grade A(excellent)/{A–Fx}

Publications Under Review

[a] M. Huska, A. Cicone, S. H. Kang, S. Morigi: A two-stage signal decomposition into Jump, Oscillation and Trend using ADMM, under review, 2022

[b] M. Huska, S. Morigi, G. A. Recupero: Geometric Texture Transfer via Local Geometric Descriptors, under review, 2022

Publications

[1] L. Calatroni, M. Huska, S. Morigi, G. A. Recupero: A Unified Surface Geometric Framework for Feature-Aware Denoising, Hole Filling and Context-Aware Completion, Journal of Mathematical Imaging and Vision, pp. 1–25, 2022

[2] A. Cicone, M. Huska, S. H. Kang, S. Morigi: JOT: a Variational Signal Decomposition into Jump, Oscillation and Trend, in IEEE Transactions on Signal Processing, vol. 70, pp. 772-784, 2022

[3] M. Huska, D. Lazzaro, S. Morigi: A forward-backward strategy for handling non-linearity in Electrical Impedence Tomography, In: Gervasi O. et al. (eds) Computational Science and Its Applications – ICCSA 2021, ICCSA 2021, Lecture Notes in Computer Science, vol 12951, Springer, Cham., pp. 635–651, 2021

[4] M. Huska, S. Morigi, G. A. Recupero: Sparsity-Aided Variational Mesh Restoration, In: Elmoataz A., Fadili J., Quéau Y., Rabin J., Simon L. (eds) Scale Space and Variational Methods in Computer Vision, SSVM 2021, Lecture Notes in Computer Science, vol 12679. Springer, Cham., pp. 437–449, 2021

[5] M. Huska, S. H. Kang, A. Lanza, S. Morigi: A Variational Approach to Additive Image Decomposition into Structure, Harmonic, and Oscillatory Components, SIAM J. Imaging Sci., 14(4), pp. 1749–1789, 2021

[6] M. Huska, M. Medla, K. Mikula, S. Morigi: Lagrangian Evolution Approach to Surface-Patch Quadrangulation, Applications of Mathematics, vol. 66 (4), pp. 509–551, 2021

[7] Y. He, M. Huska, S. H. Kang, H. Liu: Fast Algorithms for Surface Reconstruction from Point Cloud, In: Tai XC., Wei S., Liu H. (eds) Mathematical Methods in Image Processing and Inverse Problems. IPIP 2018. Springer Proceedings in Mathematics & Statistics, vol 360, Springer, Singapore, pp. 61–80, 2021

[8] M. Huska, D. Lazzaro, S. Morigi, A. Samore, G. Scrivanti: Spatially-Adaptive Variational Reconstructions for Inverse Electrical Impedance Tomography, Journal of Scientific Computing, 84(3), 2020.

[9] M. Huska, A. Lanza, S. Morigi, I. Selesnick: A convex-nonconvex variational method for the additive decomposition of functions on surfaces, Inverse Problems, 35(12), 2019.

[10] M. Huska, A. Lanza, S. Morigi, F. Sgallari: Convex non-convex segmentation of scalar fields over arbitrary triangulated surfaces, Journal of Computational and Applied Mathematics, 349, pp. 438–451, 2019.

[11] M. Huska, D. Lazzaro, S. Morigi: Shape partitioning via L_p compressed modes, J Math Imaging Vis, 60: 1111, 2018.

[12] M. Huska, A. Lanza, S. Morigi, F. Sgallari: Convex Non-Convex Segmentation over Surfaces, In Lauze, F., Dong, Y., and Dahl, A. B., editors, Scale Space and Variational Methods in Computer Vision: 6th International Conference, SSVM 2017, Lecture Notes in Computer Science, vol 10302. Springer, Cham, 2017.

[13] M. Huska, S. Morigi: A meshless strategy for shape diameter analysis, Visual Computer, 33(3), pp 303–315, 2017.

[14] M. Huska, S. Morigi: Sparsity-inducing variational shape partitioning, Electronic Transactions on Numerical Analysis, 46, pp. 36–54, 2017.

[15] M. Húska, K. Mikula, P. Novysedlák, M. Remešíková: A new form-finding method for cable constructions, In MAGIA 2012: Mathematics, Geometry and Their Applications. Proceedings. 26.-28.10.2012, Kočovce, SR, Bratislava: Publisher STU, pp. 7–18, 2013, ISBN 978-80-227-3873-6.

[16] M. Húska, M. Medľa, K. Mikula, P. Novysedlák, M. Remešíková: A new form-finding method based on mean curvature flow of surfaces. In ALGORITMY 2012: 19th Conference on scientific computing. Proceedings. Podbanské, SR, 9.-14.9.2012. Bratislava: Publisher STU, pp. 120–131, 2012, ISBN 978-80-227-3742-5.

Reviewer Assignments

- Computer Aided Geometric Design Journal (CAGD)
- SIAM Journal on Imaging Sciences (SIIMS)

Project Participation/Coordination

2022–2023 **Project Participant**, *INDAM-GNCS group research project* ***Metodi numerici per l'imaging: dal 2D al 3D***, financed by 2000 euro, one year duration.
Project Leader: Silvia Tozza

2019–2020 **Project Scientific Responsible**, *Young researcher's project INDAM-GNCS 2019* ***Variational Approaches in Geometry Processing***, financed by 1200 euro, one year duration.

2018–2019 **Project Member**, *INDAM-GNCS group research project* ***Metodi avanzati di ottimizzazione non lineare per l'elaborazione di immagini***, financed by 5100 euro, one year duration.
Project Leader: Prof. Germana Landi

2017–2018 **Project Member**, *INDAM-GNCS group research project* ***Ottimizzazione CNC per l'image processing***, financed by 4000 euro, one year duration.
Project Leader: Prof. Serena Morigi

2014–2015 **Project Member**, *INDAM-GNCS group research project* ***Nuovi aspetti della regolarizzazione nell'Imaging***, financed by 5000 euro, one year duration.
Project Leader: Prof. Elena Loli Piccolomini

Contributions to National and International Conferences

2022 • International Conference: 1st French-Italian workshop on the Mathematics of Imaging, Vision and their Applications (MIA-MIVA), September 12–14, 2022, Laboratoire I3S, Sophia-Antipolis, France
Invited Talk on "Variational additive decomposition of images and signals into structure, harmonic and oscillatory components".

2021 • International Conference: SSVM 2021 – Scale Space and Variational Methods in Computer Vision, May 16–20, 2021, Virtual Event
Talk on "Sparsity-Aided Variational Mesh Restoration".

2020 • International Conference: SIAM IS 2020 – SIAM Conference on Imaging Science, July 6 – July 17, 2020, Virtual Event
Invited Talk on "Spatially Adaptive Image Reconstruction in Electrical Impedance Tomography", in mini-symposium "Data Driven Image Restoration".

2019 • International Conference: EnuMath 2019 – European Numerical Mathematics and Advanced Applications Conference 2019, September 30 – October 4, 2019, Egmond aan Zee, The Netherlands
Invited Talk on "A convex-nonconvex variational method for the additive decomposition of functions on surfaces", in mini-symposium "Advanced Numerical Methods in Image Processing".

• Georgia Scientific Computing Symposium, February 16, 2019, Atlanta, Georgia, USA
Poster presentation on "Convex Non-Convex Segmentation of Scalar Fields Over Arbitrary Triangulated Surfaces".

2018 • Computational Methods for Inverse Problems in Imaging Workshop, July 16–18, Como, Italy
Talk on "Convex Non-Convex Segmentation of Scalar Fields Over Arbitrary Triangulated Surfaces".

• International Conference: SIAM IS 2018, June 5–8, 2018, Bologna, Italy
Poster presentation on "Convex Non-Convex Segmentation of Scalar Fields Over Arbitrary Triangulated Surfaces".

2017 • International Conference: SMART 2017 – Second Conference on Subdivision, Geometric and Algebraic Methods, Isogeometric Analysis and Refinability in ITaly, September 17–21, 2017, Gaeta, Italy
Talk on "Mesh Quadrangulation via L_p Compressed Modes Surface Partitioning".

• Scientific School ANTIP17, July 17-21, 2017, Cagliari, Italy
Poster presentation on "Convex Non-Convex Segmentation Over Surfaces".

• International Conference: SSVM 2017 – Sixth International Conference on Scale Space and Variational Methods in Computer Vision, June 4–8, 2017, Kolding, Denmark
Talk on "Convex Non-Convex Segmentation Over Surfaces".

2015 • Networking in Numerical Analysis 2015, November 21-22, 2015, Bertinoro (FC), Italy
Talk on "Variational Shape Partitioning based on a meshless strategy for Shape Diameter Analysis".

• International Conference: Symposium Geometry Processing 2015, July 6-8, 2015, Graz, Austria
Poster presentation on "Object Partitioning based on a new dynamic strategy for shape diameter analysis".

Seminars

2020 • Conclusive INDaM-GNCS project meeting: Optimization methods for machine learning and image processing, January 31, 2020, Florence, Italy
Talk on "Variational Approaches to Additive Image Decomposition".

2019 • Cycle of seminars in Applied and Computational Mathematics, School of Mathematics, Georgia Institute of Technology, Atlanta, Georgia, USA
Seminar on "Convex Non-Convex Approach in Segmentation and Decomposition of Scalar Fields over Triangulated Surfaces", February 11, 2019

2014 • Cycle of seminars in Numerical Analysis, Department of Mathematics, University of Bologna, Bologna (BO), Italy
Seminar on "Topological changes in Surface evolution using Lagrangian approach", December 5, 2014

Teaching Experience

AY 2018/19 – AY 2021/22 **Teaching Assistant**, *Scuola di Ingegneria e Architettura, Università Degli Studi di Bologna*, Bologna, Italy.
Master's degree course *Numerical Methods* for Civil Engineering; Annual contracts Prot. no. 115573, Prot. no. 305514, Prot. no. 163019

AY 2020/21 **Thesis Co-supervisor**, *Master's degree student Giuseppe Recupero*, Thesis *"A Variational Non-Convex Model for Surface Denoising"*.

AY 2019/20 **Thesis Co-supervisor**, *Master's degree student Gabriele Scrivanti*, Thesis *"Nonsmooth Nonconvex Variational Reconstruction for Electrical Impedance Tomography"*.

AY 2016/17 **Teaching Assistant**, *Scuola di Ingegneria e Architettura, Università Degli Studi di Bologna*, Bologna, Italy.
Master's degree course *Computer Graphics* for Informatics Engineering;
Pro bono activity

AY 2014/15 – AY 2016/17 **Teaching Assistant**, *Scuola di Ingegneria e Architettura, Università Degli Studi di Bologna*, Bologna, Italy.
Master's degree course *Numerical Methods* for Civil Engineering;
Annual contracts Prot. no. 41157, Prot. no. 1263 and Prot. no. 6163

Schools and Courses attended

2021 • STAG – Smart Tools and Applications in Graphics: Graduate School, October 26–27, 2021, Virtual Event

2018 • SIAM IS Scientific School: Mathematics in Imaging Science, May 28 – June 2, 2018, Bologna, Italy

• Scientific School: Computational Methods for Inverse Problems in Imaging, May 21–25, 2018, Como, Italy

2017 • Scientific School: Advanced Numerical Techniques for Inverse Problems, with Applications in Imaging Science and Applied Geophysics (ANTIP17), July 17-21, 2017, Cagliari, Italy
courses on Optimization Techniques for Image Processing and Inverse Problems

2016 • Course on Advanced Numerical Methods for Image and Surface processing, CIRAM, University of Bologna, June 8 - July 8 2016

2015 • Graduate school SGP 2015, July 6-8, 2015, Graz, Austria
courses on Optimization Techniques for Geometry Processing, Variational time integrators, Mappings, Spectral Processing Skinning, Machine Learning Techniques for Geometric Modeling Registration

• CINECA – HPC Numerical and domain specific Libraries course, March 11-13, 2015, Bologna

Memberships

2021 – present Unione Matematica Italiana per Matematica delle Immagini, della Visione e delle loro Applicazioni (UMI-MIVA).

2020 – present Post-graduate Researchers in Inverse problems, Machine learning, and Optimization group (PRIMO).

2015 – present Gruppo Nazionale per il Calcolo Scientifico (INdAM-GNCS).

Computer Skills

Languages Knowledge of C, C++, Matlab, basics of OpenGL, BASH, PYTHON, Django, HTML, CSS

Platforms Windows, Linux

Tools Matlab, Wolfram Mathematica, Visual Studio, ParaView, MeshLab, Microsoft Office, experienced in ANSYS, AutoCad

Languages

Self-assessment European level CEFR (C2 maximum evaluation)

		Understanding		**Speaking**		**Writing**
		Listening	Reading	Interaction	Production	
English	**Advanced**	*C1*	*C1*	*C1*	*C1*	*C1*
Italian	**Upper Intermediate**	*C1*	*C1*	*B2*	*B2*	*B2*
German	**Pre-Intermediate**	*A2*	*B1*	*A2*	*A2*	*A2*

Honours and Awards

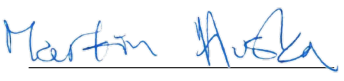
2019 Winner of Young Researchers' Grant (Finanziamento Giovani Ricercatori) of INdAM–GNCS, Project Title: Variational Approaches in Geometry Processing

2013 3rd place – Student Scientific Conference (SSC) 2013 (Slovak university of Technology, Faculty of Civil Engineering, Mathematical section)
Local round of International SSC in mathematics

2012 1st place – ABF Slovakia BAKALAR 2012 Awards (Structural and Transportation Engineering section)
National awards for best bachelor thesis in engineering.

I agree to the treatment and diffusion of my data according to the Law 196/2003.

Bologna, December 20, 2022



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