

WHO AM I?

Scientist with 15+ years of experience developing pioneering computational modeling techniques for analysis and design in solid mechanics. I hold a BSc from Argentina, and both an MSc (as a Fulbright Scholar) and PhD from the University of Illinois at Urbana-Champaign (UIUC), USA. Following postdoctoral roles at UIUC and EPFL, I joined TU Delft, where I am currently Associate Professor in Computational Design and Mechanics. My research focuses on developing advanced enriched finite element and topology optimization methodologies to address design challenges across biomimetic and composite materials, acoustic/elastic metamaterials, photonic and phononic crystals, edible metamaterials, and origami. I hold two patents in noise attenuation applications using acoustic/elastic metamaterials and phononic crystals, and am the lead author of the book "*Fundamentals of Enriched Finite Element Methods*" (Elsevier, 2023). As director of the *Machine Intelligence Advances for Materials (MACHINA) lab*, I integrate machine learning into computational design. Fluent in Spanish, English, and French.

RESEARCH INTERESTS

1. Development of novel computational modeling (enriched, virtual, and spectral finite element methods) for multiphase materials ■ damage and fracture ■ contact and non-conforming mesh coupling ■ immersed boundary (fictitious domain) problems
2. Computational design via optimization (single and multi-objective optimization) ■ topology optimization ■ evolutionary algorithms ■ machine learning
3. Deployment of machine learning in computational mechanics, including ■ autoencoders as reduced-order models ■ neural topology optimization ■ symbolic regression (i.e., to determine mathematical expressions from noisy data)
4. Application of all these methodologies to the design of novel (meta)materials and structures, including biomimetic materials ■ composites ■ fracture metamaterials ■ acoustic/elastic metamaterials and phononic crystals ■ photonic crystals and photonic devices ■ origami

PROFESSIONAL APPOINTMENTS

- 2023 – present **Associate Professor** **Delft University of Technology, THE NETHERLANDS**
Faculty of Mechanical, Maritime and Materials Engineering
■ Completed the the Associate Professor Leadership Programme on Apr 2025
■ Co-director of *Machine Intelligence Advances for Materials (MACHINA) lab* since March 2022
■ Continued activities below as a member of CODE MECH
- 2015 – 2022 **Assistant Professor** **Delft University of Technology, THE NETHERLANDS**
Faculty of Mechanical, Maritime and Materials Engineering
■ Tenure awarded on Dec 2019
■ Completed the University Teaching Qualification on Aug 2017
■ Completed the the Personal Development Program on 2016
■ Joined the Computational Design and Mechanics (CODE MECH) research section to develop innovative finite element technology for solving complex engineering design problems. Academic activities include teaching, funding acquisition, supervising PhD candidates and MSc students, organizing mini-symposia and presenting research at international meetings, etc.
- 2011 – 2014 **Postdoctoral researcher** **École Polytechnique Fédérale de Lausanne, SWITZERLAND**
School of Architecture, Civil and Environmental Engineering (ENAC)
■ I worked under the supervision of Prof. Jean-François Molinari in developing computational contact mechanics algorithms for uncovering the origins of friction
- 2010 – 2011 **Postdoctoral researcher** **University of Illinois at Urbana-Champaign, USA**
Department of Aerospace Engineering
■ Worked with Prof. Philippe H. Geubelle on the multi-scale modeling and assessment of the interfacial adhesion failure of adhesives containing heterogeneous microstructures

EDUCATION

- 26th Aug, 2010 **PhD in Civil Engineering** **University of Illinois at Urbana-Champaign, USA**
■ Dissertation title: "*Computational design of microvascular biomimetic materials*"
■ Dissertation advisor: [Prof. Philippe H. Geubelle](#)
- 15th May, 2006 **MSc in Civil Engineering** **University of Illinois at Urbana-Champaign, USA**
■ Focused coursework on finite element methods and computational mechanics
■ Completed the Computer Science and Engineering (CSE) program

- Placed emphasis on analysis and design of structures
- Ranked 4th among graduating students of all engineering disciplines

INDICATORS

Updated 14 th Jan, 2025	Google Scholar	Scopus	Web of Science
Publications	65	59	52
Citations	1586	1195	977
Average Citations	24	20	19
<i>h</i> -index	21	19	18
Other Publications	14 (e.g., books, patents, journal covers, preprints, conference proceedings)		

TEACHING EXPERIENCE

May 2025 – present	Computational Design (ME46325) <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ 1 lecture on “Computational Design with Machine Learning” ▪ 3 ECTs MSc course, co-instructor 	Delft, THE NETHERLANDS
Nov 2022 – present	Nonlinear Mechcanics (ME46000) <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ 4 lectures on “Nonlinear finite element analysis” ▪ 4 ECTs MSc course, co-instructor 	Delft, THE NETHERLANDS
Feb 2017 – present	Advanced finite element methods (ME46050) <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ 4 ECTs MSc course, single instructor 	Delft, THE NETHERLANDS
Apr 2019 – Mar 2023	Enriched finite element methods (ME46080) <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ 4 ECTs MSc course, single instructor 	Delft, THE NETHERLANDS
Nov 2023	Nonlinear Material Mechanics (Graduate School on Eng. Mechanics) <i>Faculty of Engineering Technology, University of Twente</i> <ul style="list-style-type: none"> ▪ 1 lecture on “Enriched finite element methods” 	Twente, THE NETHERLANDS
Jun 2016, Feb 2021 Jun 2024	Advanced Dynamics (Graduate School on Eng. Mechanics) <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ 1 lecture on “Numerical methods for dynamics” 	Delft, THE NETHERLANDS
22 nd Jul, 2018	Short Course on Enriched Finite Element Methods <i>13th World Congress on Computational Mechanics</i> <ul style="list-style-type: none"> ▪ Taught a 1-day course in collaboration with Prof. Armando C. Duarte (UIUC) and Angelo Simone (TU Delft/University of Padua) 	New York, NY, USA
Feb 2015 – Jun 2016	Numerical Methods for Dynamics (WB1416) <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ 4 ECTs MSc course, co-instructor 	Delft, THE NETHERLANDS
2015 – present	Python programming language crash course <i>Faculty of Mechanical, Maritime and Materials Engineering</i> <ul style="list-style-type: none"> ▪ Instructed Python basic concepts to new MSc students in collaboration with Taylor board (student association of our department) once per year 	Delft, THE NETHERLANDS

MEMBERSHIP**MEMBERSHIP IN SCIENTIFIC ORGANIZATIONS**

- Member of the U.S. Association for Computational Mechanics
- Member of the International Society for Structural and Multidisciplinary Optimization (ISSMO)
- Member of the Graduate School on Engineering Mechanics in the Netherlands

EDITORIAL ROLES

- Guest editor for ICTAM 2024 Topical Collection in Structural and Multidisciplinary Optimization

REVIEWER ROLES

- *Advanced Modeling and Simulation in Engineering Sciences*
- *Applied Numerical Mathematics*

- *Composites Science and Technology*
- *Computational Mechanics*
- *Computer Methods in Applied Mechanics and Engineering*
- *Computers & Structures*
- *Engineering Fracture Mechanics*
- *Engineering Structures*
- *Finite Elements in Analysis and Design*
- *International Journal for Numerical Methods in Engineering*
- *International Journal of Thermal Sciences*
- *Journal of Computational Physics*
- *Journal of Intelligent Material Systems and Structures*
- *Journal of Scientific Computing*
- *Structural and Multidisciplinary Optimization*
- *Theoretical and Applied Fracture Mechanics*

DISTINCTIONS AND AWARDS

2009	<p>Mavis Memorial Fund Scholarship (Univ. of Illinois at Urbana-Champaign)</p> <ul style="list-style-type: none"> ▪ Award for outstanding research 	Urbana, IL, USA
2004	<p>Fulbright Scholarship</p> <ul style="list-style-type: none"> ▪ Granted a full scholarship to pursue a Master of Science program in Civil Engineering at the University of Illinois at Urbana-Champaign (24 scholarships awarded in Argentina that year) 	ARGENTINA
2001	<p>Member of the Flag Honor Guard (Univ. Nacional de San Juan)</p> <ul style="list-style-type: none"> ▪ Graduated with honors (ranked 4th among graduating students of all engineering disciplines), thereby qualifying for membership in the prestigious post-graduation Flag Honor Guard 	San Juan, ARGENTINA

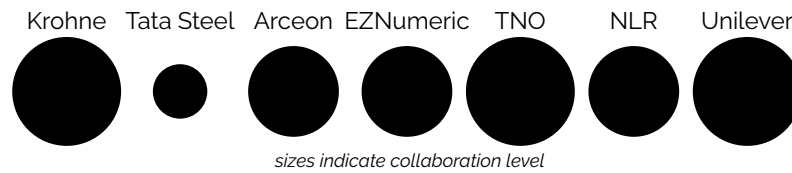
GRANTS

2025	<p>Marie Skłodowska-Curie Actions, Doctoral Networks (DN)</p> <p>HORIZON-MSCA-2024-DN-01-01: CUSTOM: Customized porous structures and advanced testing for orthopaedic implants (Co-PI, awarded 1.5 PhD projects from a total requested grant of 4 511 220.66 €)</p>	
2023	<p>Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)</p> <p>KIC Emerging Key Enabling Technologies 2022: Steering Fracture with Metamaterials (FAME): Turning failure into function (Co-PI, 1 151 511 €)</p>	
2023	<p>Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)</p> <p>NGF AiNed XS Europe: Artificial Intelligence for the Dynamics of 2D Materials (AID2MATE) (Postdoc Grant, PI, 80 000 €)</p>	
2021	<p>TU Delft Institute for Computational Science and Engineering (DCSE)</p> <p><i>Multi-GPU high-performance computing framework for ultra high-resolution structural topology optimization</i> (Postdoc Grant, Co-PI, 86 000 €)</p>	
2020	<p>Rijksdienst voor Ondernemend (RVO)</p> <p>Renewable energy program: <i>BLUE Piling Project 2</i> (IHC IQIP, Co-PI, 150 361 €)</p>	
2017	<p>Topconsortia voor Kennis en Innovatie (TKI)</p> <p><i>Multi-physics Design of Metamaterial-Based Measurement Systems</i> (Krohne, PI, 450 000 €)</p>	
2020	<p>Cohesion grants at Mechanical, Maritime and Materials Engineering (3mE)</p> <p><i>Large-scale acoustic metamaterials (mega-meta-structures) for noise mitigation</i> (PI, 200 000 €)</p>	
2019	<p><i>AI-based Optimization of Lightweight Fracture-resistant Components</i> (PI, 60 000 €)</p>	
2016	<p><i>Enabling advanced structural optimization in the transport domain</i> (Co-PI, 66 000 €)</p>	
2020	<p>Chinese Scholarship Council projects</p> <p><i>Optimizing nonlinear dynamic response of micro- and nano-mechanical resonators</i> (Co-PI)</p>	
2021	<p><i>Computational Design of Origami Metamaterials for Programmable and Tunable Vibration Isolation</i> (PI)</p>	
2017	<p><i>Enriched finite element methods for the analysis of complex microstructures</i> (Co-PI)</p>	
2016	<p><i>Enriched finite element methods for fracture-based analysis and design</i> (PI)</p>	

RESEARCH COLLABORATION

RESEARCH COLLABORATION WITH INDUSTRY AND OTHER RESEARCH INSTITUTES

2014 – present



Other contacts: MSC Software • NXP • NRG • Femto • Bond3D • Apium • Evonik • Witec • ASML

COLLABORATIONS WITH ACADEMIC PARTNERS

In addition to many ongoing collaborations within the Precision and Microsystems Engineering Department (Prof. Fred van Keulen, Prof. Matthijs Langelaar, Dr. Can Ayas, Dr. Hans Goosen, Dr. Farbod Alijani, Dr. Richard Norte, Prof. Peter Steeneken, to name a few, I also have strong collaborations with scholars within our faculty and beyond:

- **Prof. C. Armando Duarte** (University of Illinois at Urbana-Champaign): Professor and CEE Excellence Faculty Scholar in the Department of Civil and Environmental Engineering; fellow of the National Center for Supercomputing Applications. Armando is a co-author of our book "*Fundamentals of Enriched Finite Element Methods*".
- **Prof. C. Angelo Simone** (University of Padua): Professor in Computational Mechanics. He is a co-author on publications and co-supervises PhD candidate Dongyu Liu.
- **Dr. Corentin Coulais** (University of Amsterdam): Associate Professor at Van der Waals-Zeeman Instituut, Faculty of Science.
- **Prof. Max Witjes** (University Medical Center Groningen): Associate Professor at the department of Oral and Maxillofacial Surgery.
- **Prof. Soheil Soghrati** (Ohio State University): Associate Professor of Mechanical and Aerospace Engineering and Materials Science and Engineering.
- **Dr. Miguel Bessa** (Brown University): Associate Professor at the School of Engineering. I collaborate with Dr. Bessa in the development of machine learning for topology optimization. We currently co-supervise PhD candidate Surya Narayanan.
- **Dr. Reza Abedi** (The University of Tennessee at Knoxville): Associate Professor in the department of Mechanical Aerospace and Biomedical Engineering.
- **Dr. Anastasiia Krushynska** (University of Groningen): Assistant Professor at the faculty of Science and Engineering (Engineering and Technology Institute Groningen).

PUBLICATIONS

Selected press articles

1. **Advanced Science News:** 3D printing the perfect piece of chocolate. May 2022 [🔗](#).
2. **BBC** Have scientists designed the 'perfect' chocolate? Apr. 2022 [🔗](#).
3. **Gizmodo:** Scientists Say They've Created Crispier Chocolate Using 3D Printers. Apr. 2022 [🔗](#).
4. **Medium:** Metamaterial experts have designed the perfect chocolate cube shape — Why does it look so weird? Apr. 2022 [🔗](#).
5. **Phys.org:** Designing the perfect piece of chocolate. Apr. 2022 [🔗](#).
6. **The Washington Post:** How to make a tastier chocolate? Use geometry. Oct. 2022 [🔗](#).

Books

1. A. M. Aragón. "Computational design of microvascular biomimetic materials". PhD Dissertation. University of Illinois at Urbana-Champaign, Oct. 2010 [🔗](#).
2. A. M. Aragón and C. A. Duarte. *Fundamentals of Enriched Finite Element Methods*. 1st. Edition. Elsevier, Nov. 2023.

Patents

1. A. M. Aragón, J. Jovanova, and A. C. Azevedo Vasconcelos. *Load transfer interface, system for selectively applying a mechanical load to an object, method for designing a load transfer interface, and method for driving an object into the ground*. WO 2023/017013 A1, 2023.
2. A. M. Aragón, S. V. Valappil, and J. Hogendoorn. *Ultrasonic Transducer and Ultrasonic Flowmeter*. US 2023/0130690 A1, 2023.

Journal covers

1. J. Zhang, E. Zhebel, S. J. van den Boom, D. Liu, and A. M. Aragón. "Featured Cover". *Int J Numer Meth Eng* 123.21 (2022), pp. i-i.
2. S. J. van den Boom, J. Zhang, F. van Keulen, and A. M. Aragón. "Cover Image". *Int J Numer Meth Eng* 120.10 (2019), pp. i-i.

Journal Publications

1. H. J. Algra, Z. Li, M. Langelaar, F. Alijani, and A. M. Aragón. "Dissipation dilution-driven topology optimization for maximizing the Q factor of nanomechanical resonators". *Comput Methods Appl Mech Eng* 444 (2025), p. 118060.
2. Y. Gandhi, A. M. Aragón, J. Norato, and G. Minak. "A geometry projection method for the topology optimization of additively manufactured variable-stiffness composite laminates". *Comput Methods Appl Mech Eng* 435 (2025), p. 117663.
3. Z. Li, F. Alijani, A. Sarafraz, M. Xu, R. A. Norte, A. M. Aragón, and P. G. Steeneken. "Finite element-based nonlinear dynamic optimization of nanomechanical resonators". *Microsyst Nanoeng* 11.1 (2025), p. 16.
4. D. Liu, J. Zhang, A. M. Aragón, and A. Simone. "The discontinuity-enriched finite element method for multiple intersecting discontinuities". *Comput Methods Appl Mech Eng* 433 (2025), p. 117432.
5. G. Reales Gutiérrez, A. M. Aragón, H. F. L. Goosen, A. Bornheim, and F. van Keulen. "Coupled thermo-electro-mechanical topology optimization for cooling applications under electrical constraints". *Struct Multidiscip O* 68.7 (2025), p. 141.
6. S. V. Valappil and A. M. Aragón. "Analytical modeling of damped locally-resonant metamaterials". *Wave Motion* 136 (2025), p. 103527.
7. S. V. Valappil, A. M. Aragón, and J. F. L. Goosen. "Directional band gap phononic structures for attenuating crosstalk in clamp-on ultrasonic flowmeters". *Mech Syst Signal Process* 224 (2025), p. 112173.
8. J. Zhang, Y. Yan, C. A. Duarte, and A. M. Aragón. "A Discontinuity-Enriched Finite Element Method (DE-FEM) for modeling quasi-static fracture growth in brittle solids". *Comput Methods Appl Mech Eng* 435 (2025), p. 117585.
9. A. C. Azevedo Vasconcelos, S. Valiya Valappil, D. Schott, J. Jovanova, and A. M. Aragón. "A metamaterial-based interface for the structural resonance shielding of impact-driven offshore monopiles". *Eng Struct* 300 (2024), p. 117261.
10. S. van Bergen, R. A. Norte, and A. M. Aragón. "An interface-enriched generalized finite element method for the analysis and topology optimization of 2-D electromagnetic problems". *Comput Methods Appl Mech Eng* 421 (2024), p. 116748.
11. Z. Li, M. Xu, R. A. Norte, A. M. Aragón, P. G. Steeneken, and F. Alijani. "Strain engineering of nonlinear nanoresonators from hardening to softening". *Commun Phys* 7.1 (2024), p. 53.
12. G. Reales Gutiérrez, F. van Keulen, A. M. Aragón, J. F. L. Goosen, and A. Bornheim. "Multi-objective scintillator shape optimization for increased photodetector light collection". *J Opt Soc Am B* 41.9 (2024), pp. 2014–2032.
13. G. R. Reales Gutiérrez, F. v. Keulen, J. F. L. Goosen, A. M. Aragón, and A. Bornheim. "Enhancing the cooling performance of thermocouples: a power-constrained topology optimization procedure". *Struct Multidiscip O* 67.189 (2024).
14. J. Rommers, V. van der Wijk, A. M. Aragón, and J. L. Herder. "The STAGE method for simultaneous design of the stress and geometry of flexure mechanisms". *Precis Eng* (2024).
15. S. Valiya Valappil, J. F. L. Goosen, and A. M. Aragón. "Multi-objective design of 3D phononic crystal waveguide by design space trimming". *Mater Des* 237 (2024), p. 112594.
16. S. J. van den Boom, R. Abedi, F. van Keulen, and A. M. Aragón. "A level set-based interface-enriched topology optimization for the design of phononic crystals with smooth boundaries". *Comput Methods Appl Mech Eng* 408 (2023), p. 115888.
17. A. Keşkekler, V. Bos, A. M. Aragón, F. Alijani, and P. G. Steeneken. "Multimode Nonlinear Dynamics of Graphene Resonators". *Phys Rev Applied* 20 (6 Dec. 2023), p. 064020.
18. A. O. Krushynska, D. Torrent, A. M. Aragón, R. Ardito, O. R. Bilal, B. Bonello, F. Bosia, Y. Chen, J. Christensen, A. Colombi, S. A. Cummer, B. Djafari-Rouhani, F. Fraternali, P. I. Galich, P. D. Garcia, J.-P. Groby, S. Guenneau, M. R. Haberman, M. I. Hussein, S. Janbaz, N. Jiménez, A. Khelif, V. Laude, M. J. Mirzaali, P. Packo, A. Palermo, Y. Pennec, R. Picó, M. R. López, S. Rudykh, M. Serra-García, C. M. Sotomayor Torres, T. A. Starkey, V. Tournat, and O. B. Wright. "Emerging topics in nanophononics and elastic, acoustic, and mechanical metamaterials: an overview". *Nanophotonics* 12.4 (2023-04-26 2023), pp. 659–686.
19. Z. Li, M. Xu, R. A. Norte, A. M. Aragón, F. van Keulen, F. Alijani, and P. G. Steeneken. "Tuning the Q-factor of nanomechanical string resonators by torsion support design". *Appl Phys Lett* 122.1 (2023), p. 013501.
20. S. Valiya Valappil, A. M. Aragón, and H. Goosen. "Phononic crystals' band gap manipulation via displacement modes". *Solid State Commun* 361 (2023), p. 115061.
21. S. Valiya Valappil, J. F. L. Goosen, and A. M. Aragón. "Phononic Crystals for Suppressing Crosstalk in Ultrasonic Flowmeters". *IEEE Trans Instrum Meas* 72 (2023), pp. 1–11.
22. S. Valiya Valappil, A. O. Krushynska, and A. M. Aragón. "Analytical characterization of the dynamic response of viscoelastic metamaterials". *Comput Mater Sci* 229 (2023), p. 112385.
23. A. Chandrashekar, A. Givois, P. Belardinelli, C. L. Penning, A. M. Aragón, U. Staufer, and F. Alijani. "Sensitivity of viscoelastic characterization in multi-harmonic atomic force microscopy". *Soft Matter* 18 (46 2022), pp. 8748–8755.
24. D. Liu, S. J. van den Boom, A. Simone, and A. M. Aragón. "An interface-enriched generalized finite element formulation for locking-free coupling of non-conforming discretizations and contact". *Comput Mech* 70.3 (2022), pp. 477–499.
25. A. Souto, J. Zhang, A. M. Aragón, K. P. Velikov, and C. Coullais. "Edible mechanical metamaterials with designed fracture for mouthfeel control". *Soft Matter* 18 (15 2022), pp. 2910–2919.
26. J. Zhang and A. M. Aragón. "An improved stress recovery technique for the unfitted finite element analysis of discontinuous gradient fields". *Int J Numer Meth Eng* 123.3 (2022), pp. 639–663.
27. J. Zhang, F. van Keulen, and A. M. Aragón. "On tailoring fracture resistance of brittle structures: A level set interface-enriched topology optimization approach". *Comput Methods Appl Mech Eng* 388 (2022), p. 114189.
28. J. Zhang, E. Zhebel, S. J. van den Boom, D. Liu, and A. M. Aragón. "An object-oriented geometric engine design for discontinuities in unfitted/immersed/enriched finite element methods". *Int J Numer Meth Eng* 123.21 (2022), pp. 5126–5154.
29. S. J. van den Boom, J. Zhang, F. van Keulen, and A. M. Aragón. "An interface-enriched generalized finite element method for level set-based topology optimization". *Struct Multidiscip O* 63.1 (2021), pp. 1–20.
30. E. De Lazzari, S. J. van den Boom, J. Zhang, F. van Keulen, and A. M. Aragón. "A critical view on the use of Non-Uniform Rational B-Splines to improve geometry representation in enriched finite element methods". *Int J Numer Meth Eng* 122.5 (2021/02/22 2021), pp. 1195–1216.
31. A. M. Aragón, B. Liang, H. Ahmadian, and S. Soghrati. "On the stability and interpolating properties of the Hierarchical Interface-enriched Finite Element Method". *Comput Methods Appl Mech Eng* 362 (2020), p. 112671.
32. A. M. Aragón and A. Simone. "Discussion on 'A linear complete extended finite element method for dynamic fracture simulation with non-nodal enrichments' [Finite Elem. Anal. Des. 152 (2018)] by I. Asareh, T.-Y. Kim, and J.-H. Song". *Finite Elem Anal Des* 168 (2019), p. 103340.

33. S. J. van den Boom, J. Zhang, F. van Keulen, and A. M. Aragón. "A stable interface-enriched formulation for immersed domains with strong enforcement of essential boundary conditions". *Int J Numer Meth Eng* 120.10 (2019), pp. 1163–1183.
34. M. Mengolini, M. F. Benedetto, and A. M. Aragón. "An engineering perspective to the virtual element method and its interplay with the standard finite element method". *Comput Methods Appl Mech Eng* 350 (2019), pp. 995–1023.
35. J. Zhang, S. J. van den Boom, F. van Keulen, and A. M. Aragón. "A stable discontinuity-enriched finite element method for 3-D problems containing weak and strong discontinuities". *Comput Methods Appl Mech Eng* 355 (2019), pp. 1097–1123.
36. H. Q. Do, A. M. Aragón, and D. L. Schott. "A calibration framework for discrete element model parameters using genetic algorithms". *Adv Powder Technol* 29.6 (2018), pp. 1393–1403.
37. A. M. Aragón and A. Simone. "The Discontinuity-Enriched Finite Element Method". *Int J Numer Meth Eng* 112.11 (2017), nme.5570, pp. 1589–1613.
38. F. Demoures, F. Gay-Balmaz, M. Desbrun, T. S. Ratiu, and A. M. Aragón. "A multisymplectic integrator for elastodynamic frictionless impact problems". *Comput Methods Appl Mech Eng* 315 (2017), pp. 1025–1052.
39. D. K. Gupta, G. J. van der Veen, A. M. Aragón, M. Langelaar, and F. van Keulen. "Bounds for decoupled design and analysis discretizations in topology optimization". *Int J Numer Meth Eng* 111.1 (2017), pp. 88–100.
40. R. Sharma, J. Zhang, M. Langelaar, F. Keulen, and A. M. Aragón. "An improved stress recovery technique for low-order 3D finite elements". *Int J Numer Meth Eng* 114.1 (2017), pp. 88–103.
41. A. Cuba-Ramos, A. M. Aragón, S. Soghrati, P. H. Geubelle, and J.-F. Molinari. "A new formulation for imposing Dirichlet boundary conditions on non-matching meshes". *Int J Numer Meth Eng* 103.6 (2015), pp. 430–444.
42. A. M. Aragón. "A G¹¹ implementation of arbitrary-rank tensors for high-performance computing". *Comput Phys Commun* 185.6 (2014), pp. 1681–1696.
43. A. M. Aragón and J.-F. Molinari. "A hierarchical detection framework for computational contact mechanics". *Comput Methods Appl Mech Eng* 268.0 (2014), pp. 574–588.
44. S. Soghrati, A. M. Aragón, and P. H. Geubelle. "Design of actively-cooled microvascular materials: a genetic algorithm inspired network optimization". *Struct Multidiscip O* 49.4 (2014), pp. 643–655.
45. A. M. Aragón. "A measure for the impact of research". *Sci Rep* 3 (2013), p. 1649.
46. A. M. Aragón, R. Saksena, B. D. Kozola, P. H. Geubelle, K. T. Christensen, and S. R. White. "Multi-physics optimization of three-dimensional microvascular polymeric components". *J Comput Phys* 233 (2013), pp. 132–147.
47. A. M. Aragón, S. Soghrati, and P. H. Geubelle. "Effect of in-plane deformation on the cohesive failure of heterogeneous adhesives". *J Mech Phys Solids* 61.7 (2013), pp. 1600–1611.
48. A. M. Aragón, V. A. Yastrebov, and J.-F. Molinari. "A constrained-optimization methodology for the detection phase in contact mechanics simulations". *Int J Numer Meth Eng* 96.5 (2013), pp. 323–338.
49. S. Soghrati, A. M. Aragón, C. Armando Duarte, and P. H. Geubelle. "An interface-enriched generalized FEM for problems with discontinuous gradient fields". *Int J Numer Meth Eng* 89.8 (2012), pp. 991–1008.
50. A. M. Aragón, K. J. Smith, P. H. Geubelle, and S. R. White. "Multi-physics design of microvascular materials for active cooling applications". *J Comput Phys* 230.13 (2011), pp. 5178–5198.
51. A. M. Aragón, C. A. Duarte, and P. H. Geubelle. "Generalized finite element enrichment functions for discontinuous gradient fields". *Int J Numer Meth Eng* 82.2 (2010), pp. 242–268.
52. S. C. Olugebefola, A. M. Aragón, C. J. Hansen, A. R. Hamilton, B. D. Kozola, W. Wu, P. H. Geubelle, J. A. Lewis, N. R. Sottos, and S. R. White. "Polymer Microvascular Network Composites". *J Compos Mater* 44.22 (2010), pp. 2587–2603.
53. W. Wu, C. J. Hansen, A. M. Aragón, P. H. Geubelle, S. R. White, and J. A. Lewis. "Direct-write assembly of biomimetic microvascular networks for efficient fluid transport". *Soft Matter* 6 (4 2010), pp. 739–742.
54. A. M. Aragón, J. K. Wayer, P. H. Geubelle, D. E. Goldberg, and S. R. White. "Design of microvascular flow networks using multi-objective genetic algorithms". *Comput Methods Appl Mech Eng* 197.49–50 (2008), pp. 4399–4410.

Preprint articles

1. A. M. Aragón and H. J. Algra. "ARCADE: An interactive playground for real-time immersed topology optimization". *arXiv:2501.13564* (2025).
2. M. S. Suryanarayanan, A. M. Aragón, and M. A. Bessa. "Neural topology optimization: the good, the bad, and the ugly". *arXiv:2407.13954* (2024).
3. J. F. Schumann and A. M. Aragón. "A machine learning approach for fighting the curse of dimensionality in global optimization". *arXiv:2110.14985* (2023).

Conference Publications

1. A. C. Azevedo Vasconcelos, D. Schott, A. M. Aragón, and J. Jovanova. "Single-Phase Elastic Metamaterials for Wave Filtering". Vol. ASME 2021 Conference on Smart Materials, Adaptive Structures and Intelligent Systems. V001T01A015. Sept. 2021.
2. H. Q. Do, A. M. Aragón, and D. L. Schott. "Automated discrete element method calibration using genetic and optimization algorithms". *Powders and Grains – 8th International Conference on Micromechanics on Granular Media*. Vol. 140. 2017, p. 15011.
3. S. J. van den Boom, A. M. Aragón, and F. van Keulen. "Mesh-independent design of phononic crystals using an advanced finite element formulation". *Proceedings of the ASME 2016 International Mechanical Engineering Congress & Exposition*. Nov. 2016.
4. A. M. Aragón, P. H. Geubelle, and S. R. White. "Bio-mimetic microvascular material for autonomic healing, cooling and sensing applications". *Proceedings of the US-Korea Workshop on Bio-Inspired Sensor Technology and Infrastructure Monitoring*. Jeju, Korea, June 2008.
5. A. M. Aragón, C. J. Hansen, W. Wu, P. H. Geubelle, J. A. Lewis, and S. R. White. "Computational design and optimization of a biomimetic self-healing/cooling material". *Proceedings of SPIE*. Vol. 6526. 2007.
6. W. Wu, C. J. Hansen, A. M. Aragón, N. R. Sottos, S. R. White, P. H. Geubelle, and J. A. Lewis. "Direct ink writing of microvascular networks". *Proceedings of the First International Conference on Self Healing Materials*. Noordwijk aan Zee, The Netherlands, 2007.

Coding projects

1. *Akantu* (object-oriented Finite Element library). URL: <https://akantu.ch>.
2. A. M. Aragón. *hybrida*: A new paradigm in finite element analysis by combining Python and G⁺.

3. A. M. Aragón. *ARCADE: Augmented Reality Computational Analysis and Design Environment*. URL: <https://apps.apple.com/us/app/arcade-topology/id6742103633>.
4. A. M. Aragón. *cpp-array*, from *Comput. Phys. Commun.* **185(2014)1681**. Revisions: URL: http://cpc.cs.qub.ac.uk/summaries/AESA_v1_0.html.
5. A. M. Aragón. *Research Impact Calculator*. URL: <https://pypi.org/project/research-impact/>.

CONFERENCE PRESENTATIONS

- Jul 23–27, 2023 **18th US National Congress on Computational Mechanics (USNCCM18)** Chicago, IL, USA
- A. M. Aragón. "A path of discovery on enriched finite element methods".
 - A. M. Aragón Hendrik J. Algra. "ARCADE: An interactive playground for real time immersed topology optimization".
 - **Organizer:** *Mini-Symposium in Honor of Prof. Philippe Geubelle's 60th Birthday: Advanced Computational Methods and Machine Learning Algorithms in Solid and Fluid Mechanics*.
- May 18–23, 2025 **16th World Cong. of Structural and Multidisciplinary Optimization (WCSMO16)** Kobe, JAPAN
- A. M. Aragón Hendrik J. Algra. "ARCADE: An interactive playground for real time immersed topology optimization".
- Aug 25–30, 2024 **26th International Congress of Theoretical and Applied Mechanics** Daegu, SOUTH KOREA
- A. M. Aragón, S. Liu, L. Domino, and C. Coulais. "Topology Optimization of Fracture Metamaterials."
 - **Session chairman:** *Metamaterials, architected materials and topology optimization*.
- Jul 21–26, 2024 **16th World Congress on Computational Mechanics** Vancouver, CANADA
- A. M. Aragón, J. Zhang, and Y. Yan. "A Discontinuity-Enriched Finite Element Method for Modeling Fracture Growth in Brittle Materials".
 - **Organizer:** *Current trends and advances in enriched finite element methods and coupled simulations*.
- Jun 3–7, 2024 **9th European Congress on Comp. Methods in Applied Sciences and Engineering** Lisbon, PORTUGAL
- A. M. Aragón, J. Zhang, and Y. Yan. "A Discontinuity-Enriched Finite Element Method for Modeling Fracture Growth in Brittle Materials".
 - **Organizer:** *Current trends and advances in enriched finite element methods and coupled simulations*.
- Jul 23–27, 2023 **17th US National Congress on Computational Mechanics (USNCCM17)** Albuquerque, New Mexico, USA
- A. M. Aragón, S. Liu, S. van Bergen, S. J. van den Boom, J. Zhang, R. Norte, and F. van Keulen. "A Level Set-Based Interface-Enriched Topology Optimization for Photonic, Phononic, and Fracture Design".
 - Y. Yan, and J. Zhang, and A. M. Aragón. "A Discontinuity-Enriched Finite Element Method for Crack Growth in Brittle Materials".
 - **Organizer:** *Current trends and advances in coupled simulations and enriched finite element methods*.
- Jun 21–23, 2023 **7th International Conference on Computational Modeling of Fracture and Failure of Materials and Structures (CFRAC 2023)** Prague, CZECH REPUBLIC
- A. M. Aragón, Y. Yan, and J. Zhang. "A Discontinuity-Enriched Finite Element Method for Crack Growth in Brittle Materials".
- Jun 5–9, 2023 **15th World Cong. of Structural and Multidisciplinary Optimization (WCSMO15)** Cork, IRELAND
- A. M. Aragón, S. Liu, S. van Bergen, S. J. van den Boom, J. Zhang, R. Norte, and F. van Keulen. "A level set-based interface-enriched topology optimization for problems that mandate for smooth boundaries".
- Jul 31–Aug 5, 2022 **15th World Congress on Computational Mechanics (WCCM XV)** ONLINE (Yokohama, JAPAN)
- A. M. Aragón, D. Liu, S. J. van den Boom, and A. Simone. "An interface-enriched generalized finite element formulation for locking-free coupling of non-conforming discretizations and contact".
 - **Organizer:** *Enriched finite element methods and non-intrusive coupling algorithms*.
- Jun 5–9, 2022 **8th European Congress on Comp. Methods in Applied Sciences and Engineering** Oslo, NORWAY
- A. M. Aragón, J. Zhang, S. J. van den Boom, D. Liu, A. Simone, and F. van Keulen. "Interface-enriched generalized finite element methods for coupling meshes, contact, and topology optimization".
- May 23–25, 2022 **10th Contact Mechanics International Symposium (CMIS) 2022** Chexbres, SWITZERLAND
- D. Liu, S. van den Boom, A. Simone, and A. M. Aragón. "An interface-enriched generalized finite element formulation for locking-free coupling of non-conforming discretizations and contact".
- Apr 25–27, 2022 **EUROMECH Colloquium "Emerging topics in acoustic/mech. metamaterials"** Benicàssim, SPAIN
- A. M. Aragón, S. Valiya Valappil, S. van den Boom, J.F.L. Goosen, and F. van Keulen. "Computational design of phononic crystals".

- Aug 22–27, 2021 **25th International Congress of Theoretical and Applied Mechanics** ONLINE (Milano, ITALY)
 ■ S. van den Boom, F. van Keulen, and A. M. Aragón. "On the smoothness of boundaries for the computational design of phononic crystals".
- Jul 25–29, 2021 **16th US National Congress on Computational Mechanics (USNCCM16)** ONLINE (Chicago, IL, USA)
 ■ A. M. Aragón, S. van den Boom, J. Zhang, D. Liu, A. Simone, and F. van Keulen. "An Overview of Interface- and Discontinuity-Enriched Finite Element Methods with Emphasis on Topology Optimization".
 ■ **Organizer:** *Enriched finite element methods and non-intrusive coupling algorithms.*
- Jan 11–15, 2021 **14th World Congress on Computational Mechanics (WCCM XIV)** ONLINE (Paris, FRANCE)
 ■ A. M. Aragón, S. van den Boom, J. Zhang, D. Liu, A. Simone, and F. van Keulen. "[Interface- and discontinuity-enriched finite element methods applied to fracture, contact, topology optimization, and immersed boundary problems](#)".
 ■ **Organizer:** *Enriched finite element methods and non-intrusive coupling algorithms.*
- Jul 28–Aug 1, 2017 **15th US National Congress on Computational Mechanics (USNCCM15)** Austin, TX, USA
 ■ A. M. Aragón, S. van den Boom, J. Zhang, and F. van Keulen. "A Stable Discontinuity-Enriched Finite Element Method with Strong Enforcement of Dirichlet Boundary Conditions".
 ■ **Organizer:** *Enriched finite element methods and non-intrusive coupling algorithms.*
- May 20–24, 2019 **13th World Cong. of Structural and Multidisciplinary Optimization (WCSMO13)** Beijing, CHINA
 ■ S. van den Boom, A. M. Aragón, and F. van Keulen. "Level-set optimization of Phononic Crystals using the Interface-enriched Generalized Finite Element Method".
- Jul 22–27, 2018 **The 13th World Congress on Computational Mechanics (WCCM XIII)** New York, NY, USA
 ■ A. M. Aragón, J. Zhang, S. J. van den Boom, E. De Lazzari, D. Liu, M. van der Kolk, M. Langelaar, A. Simone, and F. van Keulen. "The Discontinuity-Enriched Finite Element Method (DE-FEM): New developments for fracture and unfitted mesh problems".
- Jun 11–15, 2018 **6th European Conference on Computational Mechanics (ECCM6)** Glasgow, SCOTLAND
 ■ A. M. Aragón, J. Zhang, S. J. van den Boom, E. De Lazzari, D. Liu, M. van der Kolk, M. Langelaar, A. Simone, and F. van Keulen. "DE-FEM: A new enriched formulation for modeling weak and strong discontinuities".
- Jul 17–20, 2017 **14th US National Congress on Computational Mechanics (USNCCM14)** Montreal, CANADA
 ■ A. M. Aragón and A. Simone. "The Discontinuity-Enriched Finite Element Method (DE-FEM)".
 ■ **Organizer:** *Computational methods for modeling interfaces with complex/evolving topologies.*
- Jun 19–21, 2017 **eXtended Discretization Methods (ECCOMAS conference) (X-DMS 2017)** Umeå, SWEDEN
 ■ A. M. Aragón and A. Simone. "The Discontinuity-Enriched Finite Element Method (DE-FEM)".
 ■ **Organizer:** *Enriched finite element methods.*
- Oct 10–12, 2016 **USACM Conf. on Isogeometric Analysis and Meshfree Methods (IGA-MF'16)** La Jolla, CA, USA
 ■ A. M. Aragón and A. Simone. "The discontinuity-enriched Generalized Finite Element Method".
- Jul 24–29, 2016 **The 12th World Congress on Computational Mechanics (WCCM XII)** Seoul, SOUTH KOREA
 ■ A. M. Aragón and A. Simone. "A new enriched formulation for strong discontinuities".
- Sep 9–11, 2015 **eXtended Discretization Methods (ECCOMAS conference) (X-DMS 2015)** Ferrara, ITALY
 ■ A. Cuba-Ramos, A. M. Aragón, S. Soghrati, P. H. Geubelle, J.-F. Molinari. "A new formulation for imposing Dirichlet boundary conditions on non-matching meshes".
- Sep 7–9, 2015 **8th Int. Workshop Meshfree Methods for PDEs (MFMPDE)** Bonn, GERMANY
 ■ A. Cuba-Ramos, A. M. Aragón, S. Soghrati, P. H. Geubelle, J.-F. Molinari. "A new formulation for imposing Dirichlet boundary conditions on non-matching meshes".
- Jul 26–30, 2015 **13th US National Congress on Computational Mechanics (USNCCM13)** San Diego, CA, USA
 ■ A. Cuba-Ramos, A. M. Aragón, S. Soghrati, P. H. Geubelle, J.-F. Molinari. "A new formulation for imposing Dirichlet boundary conditions on non-matching meshes".
- Jul 10–12, 2013 **3rd Int. Conference on Computational Contact Mechanics (ICCCM2013)** Lecce, ITALY
 ■ A. M. Aragón, V. A. Yastrebov and J.-F. Molinari. "A three-level detection framework for contact mechanics simulations".
- Apr 5, 2013 **Swiss Numerics Colloquium 2013** Lausanne, SWITZERLAND
 ■ A. M. Aragón, V. A. Yastrebov and J.-F. Molinari. "A three-level detection framework for contact mechanics simulations".

- Sep 24–26, 2012 **22nd Int. Workshop on Comp. Mechanics of Materials (IWCMM XXII)** Baltimore, MD, USA
 ■ A. M. Aragón and P. H. Geubelle. "3D multi-scale cohesive failure modeling of heterogeneous adhesives".
- Jun 27–29, 2011 **Self-healing Materials 2011 (3rd International Conference)** Bath, ENGLAND
 ■ A. M. Aragón, P. H. Geubelle and S. R. White. "Computational design of microvascular materials".
- Jun 27–Jul 2, 2010 **16th Nat. Cong. of Theoretical and Applied Mechanics (USNCTAM 2010)** State College, PA, USA
 ■ P. H. Geubelle, A. M. Aragón, S. Soghrati, B. Kozola and S. R. White. "Modeling and design of microvascular materials for active cooling applications".
- Jul 16–19, 2009 **10th US National Congress on Computational Mechanics (USNCCM-X)** Columbus, OH, USA
 ■ A. M. Aragón, C. A. Duarte and P. H. Geubelle. "Generalized finite element enrichment functions for discontinuous gradient fields".
- Jun 28 –Jul 1, 2009 **Self-healing Materials 2009 (2nd International Conference)** Chicago, IL, USA
 ■ A. M. Aragón, P. H. Geubelle and S. R. White. "Multi-physics optimization of microvascular materials".
- Oct 12–15, 2008 **45th Annual Technical Meeting (Society of Engineering Science)** Urbana, IL, USA
 ■ A. M. Aragón, K. J. Smith., P. H. Geubelle and S. R. White. "Multi-physics optimization of biomimetic microvascular materials".
- 19th Mar, 2007 **Proceedings of SPIE** San Diego, CA, USA
 ■ A. M. Aragón, C. J. Hansen, W. Wu, P. H. Geubelle, J. A. Lewis and S. R. White. "Computational design and optimization of a biomimetic self-healing/cooling material".

INVITED TALKS

- 28th Jul, 2025 **Structural Engineering Seminar Series, Newmark Civil Engineering Laboratory** Urbana, IL, USA
 ■ A. M. Aragón. "Advancing Metamaterial and Structural Design with Novel Computational Mechanics and AI".
- 28th Feb, 2025 **EPFL Civil Engineering Seminar Series (CESS)** Lausanne, SWITZERLAND
 ■ A. M. Aragón. "Advanced Computational Tools for the Analysis and Design of Complex Metamaterials and Structures".
- Oct 22 – 23 2024 **27th Engineering Mechanics Symposium (Graduate School on EM)** Arnhem, THE NETHERLANDS
 ■ A. M. Aragón (workshop leader), A. O. Krushynska, C. Soyarslan, and O. Rokoš. "Metamaterials for Engineering the Impossible".
- 28th May, 2024 **Engineering and Technology Institute Groningen** Groningen, THE NETHERLANDS
 ■ A. M. Aragón. "Computational design of metamaterials".
 ■ Guess lecture for the graduate course "Composites and Metamaterials".
- 9th Mar, 2022 **Engineering and Technology Institute Groningen** Groningen, THE NETHERLANDS
 ■ A. M. Aragón. "Advanced computational tools for the analysis and design of metamaterials".
- Oct 22 – 23 2019 **22nd Engineering Mechanics Symposium (Graduate School on EM)** Arnhem, THE NETHERLANDS
 ■ A. M. Aragón (workshop leader), C. Verhoosel, and T. Weinhart. "Trends and challenges in advanced discretization and solution techniques".
- 17th Jul, 2019 **Saint-Petersburg State University (Dept. of Comp. Meth. in Continuum Mech.)** SPb, RUSSIA
 ■ A. M. Aragón. "Enriched finite element methods and their application to metamaterial optimization".
- Dec. 22 2016 **SIB SC (Sociedad de Ingenieros de BOLIVIA)** Santa Cruz de la Sierra, BOLIVIA
 ■ A. M. Aragón. "Modelación y optimización de materiales y estructuras de complejidad extrema".

SUPERVISION AND MENTORSHIP

- Dec 2014 – present **Postdoctorate Supervision** Delft, THE NETHERLANDS
Dept. of Precision and Microsystems Engineering at 3mE, TU Delft
 ■ Daily supervisor of several postdoctorate projects:

Feb 2025 – present
Maarten Theulings (daily supervisor)
Artificial Intelligence for the Dynamics of 2D Materials (AID2MATE)
Dr. Arnoud Delissen (co-supervisor)

Apr 2021 – Mar 2022	<i>Multi-GPU high-performance computing framework for ultra high-resolution structural topology optimization</i>	
	Dr. Paulo Salvador Britto Nigro (co-supervisor)	
Jun 2020 – May 2021	<i>Artificial Intelligence-based Optimization of Lightweight Fracture-resistant Components</i>	
	Dr. Huy Do (co-supervisor)	
Mar 2016 – Mar 2017	<i>Enabling Advanced Structural Optimization in the Transport Domain</i>	
	<ul style="list-style-type: none"> Best Video Award at Powders & Grains 2017, Montpellier, France (YouTube link) 	
Dec 2014 – present	Graduate Supervision <i>Dept. of Precision and Microsystems Engineering at 3mE, TU Delft</i> <ul style="list-style-type: none"> Supervised more than 30 MSc theses; Daily supervisor of several PhD candidates: 	Delft, THE NETHERLANDS
Jan 2015 – Apr 2022	Sanne van den Boom (<i>Department funded, co-promotor, daily supervisor</i>) <i>A discontinuity-enriched finite element method for the computational design of phononic crystals</i> <ul style="list-style-type: none"> PhD awarded on 6th Apr, 2022 Cover of 120th issue of IJNME [55] Recipient of the prestigious 2022 Biezeno Award, from the Royal Institute of Engineers (KIVI) and the Graduate School on Engineering Mechanics (EM) 	
Sep 2016 – Jan 2022	Jian Zhang (<i>CSC, co-promotor, daily supervisor</i>) <i>Enriched finite element methods for fracture-based analysis and design</i> <ul style="list-style-type: none"> PhD awarded on 24th Jan, 2022 Cover of 123th issue of IJNME [47] Best presentation award in "Advanced Discretization and Solution Techniques" workshop, 22nd EM symposium, Papendal 	
Aug 2018 – Sep 2024	Sabiju Valiya Valappil (<i>Krohne project, Promotor, daily supervisor</i>) <i>Phononic crystal-based devices for improving the accuracy of ultrasonic flowmeters</i> <ul style="list-style-type: none"> PhD awarded on 4th Sep, 2024 	
Nov 2020 – May 2025	Zichao Li (<i>CSC, promotor, daily supervisor</i>) <i>Optimizing of nonlinear dynamics in nano-mechanical resonators</i> <ul style="list-style-type: none"> PhD awarded on 13th May, 2025 	
Mar 2022 – Jun 2025	Guillermo Reales Gutierrez (<i>Collaboration with CERN, Promotor, daily supervisor</i>) <i>Computational Optimization of Minimum Ionizing Timing Detector Components: Improving Timing Resolution through Numerical Design Optimization</i>	
Jul 2017 – present	Dongyu Liu (<i>CSC, co-promotor, daily supervisor</i>) <i>Enriched finite element methods for the analysis of complex microstructures</i>	
Dec 2021 – present	Surya Narayanan (<i>MACHINA lab, Promotor, daily supervisor</i>) <i>Materials design with generative machine learning</i>	
May 2021 – present	Yogesh Gandhi (<i>Collaboration with University of Bologna, daily supervisor</i>) <i>Topology optimization of additively manufactured fiber-reinforced composites</i>	
2015 – present	Graduate Supervision <i>Dept. of Precision and Microsystems Engineering at 3mE, TU Delft</i> <ul style="list-style-type: none"> Daily supervisor of dozens of MSc students. 	Delft, THE NETHERLANDS
Sep 2024	Matteo Bosso <i>Data Driven Discovery of Stochastic Differential Equations</i> <ul style="list-style-type: none"> Final grade 9/10 (Cum Laude) 	
Sep 2024	Jeffrey van der Zeeuw <i>An Interface-enriched Level Set Topology Optimization for designing mandibular reconstruction plates made from a functionally graded material</i> <ul style="list-style-type: none"> Final grade 8/10 	
Jul 2024	Hessel Tijsseling <i>On the use of Modal Derivatives in Nonlinear Dynamics</i>	

- Final grade 7/10
- Jul 2024 | **David Dowes**
A p-hierarchical Interface-enriched Generalized Finite Element Method (p-IGFEM) for minimizing locking on weak discontinuous beams and plates

 - Final grade 7/10
- Mar 2024 | **Carlos Martinez Fornos**
Optimization of Acoustic Metasurfaces with Hybrid Structures for attenuation of broadband low frequency sound

 - Final grade 7/10
- Feb 2024 | **Hendrik Jaap Algra**
Optimizing Nanomechanical Resonators

 - Final grade 9.5/10 (Cum Laude)
- Feb 2024 | **Patrick de Groot**
Topology and variable optimization of a planar quasi-zero stiffness mechanism for motion isolation during the installation of wind turbine blades

 - Final grade 9/10 (Cum Laude)
- Jul 2023 | **Jujian Zhang**
A Discontinuity-Enriched Finite Element Method for Dynamic Multiple Crack Growth in Brittle Materials

 - Final grade 8.5/10 (Cum Laude)
- Jun 2023 | **Arun Thamban**
Deep Symbolic Regression for Nonlinear Dynamical Systems

 - Final grade 9/10 (Cum Laude)
- Dec 2022 | **Steven van Bergen**
An interface-enriched finite element method for electromagnetic analysis and optimization of 2D problems

 - Final grade 8/10
- Oct 2022 | **Shangru Liu**
An Interface-enriched Topology Optimization for Mitigating the Effect of Surface Flaws in 3D Brittle Structures

 - Final grade 9/10 (Cum Laude)
- Aug 2022 | **Rick van Tatenhove**
A discontinuous Galerkin based enriched finite volume method

 - Final grade 7.5/10
- Jan 2022 | **Davis Pazars**
An interface-enriched finite element method for immersed contact under large deformation kinematics

 - Final grade 7.5/10
- Nov 2021 | **Zhiyuan Xu**
A Generalized Finite Element Method with Spread and Discrete Enrichments for Capturing High Thermal Gradients in Composites

 - Final grade 8/10
- Sep 2021 | **Julian Schumann**
Autoencoder enabled global optimization

 - Final grade 9/10 (Cum Laude)
- Mar 2021 | **Yuheng Yan**
A discontinuity-enriched formulation for crack propagation

 - Final grade 8.5/10
- May 2021 | **Remco Boere**
Origami for tunable vibration isolation

 - Final grade 9/10
- Oct 2020 | **Kartik Thakur**
Locking free discontinuous nonlinear thin-walled structures

 - Final grade 9/10
- Nov 2020 | **Yogesh Kumar Pilania**
Finite element-based model order reduction for nonlinear structural dynamics

 - Final grade 7.5/10
- Oct 2020 | **Derk Kappelle**
Pareto Set Extrapolation method: an efficient solving technique for multi-objective optimization problems

 - Final grade 7.5/10

- Nov 2020 | **Yi Song**
Towards high-order discontinuity-enriched finite element method
▪ Final grade 8/10
- Nov 2019 | **Maarten Theulings**
Foldable FEM: using enriched and mixed/hybrid methods for the mesh-independent modeling of folds
▪ Final grade 9/10 (Cum Laude)
- Nov 2018 | **Koen Markestein**
Finite element based analysis and validation for nonlinear structural dynamics
▪ Final grade 9/10
- Oct 2017 | **Elena De Lazzari**
A NURBS-enhanced Discontinuity-Enriched Finite Element Method
▪ Final grade 9/10 (Cum Laude)
▪ Work resulted in an article on the use of NURBS for DE-FEM [51]
- Nov 2017 | **Michael Mengolini**
Investigating the Virtual Element Method (VEM)
▪ Final grade 110/110 (Cum Laude, University of Bologna)
Work resulted in an article on an engineering perspective of VEM [56]
- Apr 2017 | **Mahesh Ramaswamy Guru Prasad**
A interface-enriched clustered FEM for coupling non-conforming meshes
▪ Final grade 9/10
- Jul 2017 | **Thijs Smit**
Finite element modeling of non-rigid origami
▪ Final grade 8/10
- Jul 2017 | **Bart Holtzer**
Topology Optimization of Geometrically Nonlinear Structures
▪ Final grade 8/10
- Nov 2016 | **Rahul Sharma**
A Stress Recovery Procedure for 3-D Linear Finite Elements
▪ Final grade 9/10
Work resulted in the most accurate 3D stress recovery technique to date [63]
- Apr 2016 | **Jan Willem Feitsma**
Feasibility of Alternative Finite Element Formulations within Topology Optimization
▪ Final grade 8.5/10
- Jun 2016 | **Gonçalo Ferreira Nunes Gouveia Valente**
Vasculature Optimization of Actively-Cooled Materials
▪ Final grade 18/20 (Técnico Lisboa)

May 2012 – Sep 2014 | **Graduate Supervision** | Lausanne, SWITZERLAND
School of Architecture, Civil and Environmental Eng. (ENAC)
▪ Mentored PhD student Aurelia Cuba Ramos for a project that aims at understanding the mechanical effects of alkali-silica reactions in concrete built dams by using multi-scale modeling.

June – August 2007 – 2009 | **Undergraduate Supervision** | Urbana, IL, USA
Department of Aerospace Engineering, University of Illinois at Urbana-Champaign
▪ Mentored three undergraduate students under the Undergraduate Research Opportunity Program (UROP), co-sponsored by NASA and Boeing.

LANGUAGES

Spanish Native language
English Proficient (C2 level)
French Advanced (B2 level)
Dutch Introductory (A1 level)

COMPUTER SKILLS

Programming C/C++ ▪ Python ▪ Swift ▪ CMake ▪ MPI ▪ HTML
Software Mathematica ▪ Paraview
Operative systems Mac OS X ▪ Ubuntu Linux
Other L^AT_EX ▪ git ▪ mercurial

REFERENCES

Matthijs Langelaar | Professor,
Chair of Computational Design and Mechanics (CODE MECH)
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Continued on next page

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C. Armando Duarte	Nathan M. Newmark Distinguished Professor, CEE Excellence Faculty Scholar Department of Civil and Environmental Engineering University of Illinois at Urbana-Champaign +1 (217) 244-2830, caduarte@illinois.edu
Jean-François Molinari	Professor, Director of the Computational Solid Mechanics Laboratory (LSMS) School of Architecture, Civil and Environmental Engineering (ENAC) École Polytechnique Fédérale de Lausanne (EPFL) +41 21 693 24 11, jean-francois.molinari@epfl.ch
Philippe H. Geubelle	Bliss Professor and Executive Associate Dean of Grainger College of Engineering Department of Aerospace Engineering University of Illinois at Urbana-Champaign +1 (217) 244-7648, geubelle@illinois.edu
Adrian Bejan	J.A. Jones Professor of Mechanical Engineering Department of Mechanical Engineering and Materials Science Duke University +1 (919) 308-9930, abejan@duke.edu
Glaucio H. Paulino	Margareta Engman Augustine Professor of Engineering Dept. of Civil and Environmental Engineering and the Princeton Materials Institute Princeton University +1 (609) 258-8308, gpaulino@princeton.edu