

Unit Name

Mechanics and Materials Unit
Professor Eliot Fried

Collaborations

Claudio Boni, Department of Civil, Chemical and Environmental Engineering University of Genoa, Italy, Kinematic and static characterization of everting Mbius kaleidocycles with slightly incongruent links

Isaac Chenchiah, Department of Mathematics University of Bristol, UK, Nonreciprocal nonlinear elasticity

Yi-chao Chen, Department of Mechanical Engineering University of Houston, U.S.A., Mechanics of inextensional material surfaces

Fernando Duda, Department of Mechanical Engineering Universidade Federal do Rio de Janeiro, Brazil, Theory and analysis of self-assembly and pattern formation in block copolymer systems; Coupling of quantum mechanics and nonlinear elasticity; Bulk stress effects on the surface chemical pattern formation of elastic solids

Luis Espath, Department of Mathematics University of Nottingham, UK, Fluids with distinct mass and linear-momentum transport mechanisms

Roger Fosdick, Department of Aerospace Engineering and Mechanics University of Minnesota, U.S.A., Mechanics of nextensional material surfaces; Incompatibility and the transition to turbulence in pipe flow; Balanced states of rectilinear shearing for an incompressible, simple, non-Newtonian fluid

Satoshi Fujii, Professor, Okinawa Kosen in Japan, Laser-induced graphitization of polymer sheets

Alfio Grillo, Dipartimento di Scienze Matematiche (DISMA) "G. L. Lagrange" Politecnico di Torino, Italy, Internal constraints and gauge relations in the theory of uniaxial nematic elastomers

Prakhar Gupta, Department of Mechanical and Aerospace Engineering Indian Institute of Technology Hyderabad, India, Mechanics of assemblies of magnetic spheres

Jianbo Liang, Associate Professor, Osaka Metropolitan University in Japan, Diamond growth on silicon carbide

Animesh Pandey, Engineering Mechanics Unit Jawaharlal Nehru Centre of Advanced Scientific Research, India, Kinematical foundations of the mechanics of material surfaces

Andrea Pastore, Dipartimento di Scienze Matematiche (DISMA) "G. L. Lagrange" Politecnico di Torino, Italy, Internal constraints and gauge relations in the theory of uniaxial nematic elastomers

Paolo Podio-Guidugli, Accademia Nazionale dei Lincei, Italy, Foundations of the mechanics and thermodynamics of continua

Gianni F. Royer-Carfagni, Department of Systems Engineering and Industrial Technologies University of Parma, Italy, Kinematic and static characterization of everting Mbius kaleidocycles with slightly incongruent links

Brian Seguin, Department of Mathematics Loyola University Chicago, U.S.A., Construction of an isometric immersion of a bounded, planar region from a framed curve

Sankalp Tiwari, Department of Applied Mechanics Indian Institute of Technology Delhi, India, Kinematical foundations of the mechanics of material surfaces

Sankalp Tiwari, Department of Applied Mechanics Indian Institute of Technology Delhi, India, The out-of-plane bifurcation and narrow stability interval of planar solutions in the EulerPlateau problem

Gai Wu, Associate professor, Wuhan University in China, Diamond growth on gallium oxide

Research Personnel

Stoffel Janssens, Senior Staff Scientist

Vishesh Bhat, Postdoctoral Scholar

Ariel Boiardi, Postdoctoral Scholar

Md Intaf Alam, Postdoctoral Scholar

Sankalp Tiwari, Postdoctoral Scholar

Garima, Research Unit Technician

Michael Grunwald, Research Unit Technician

David Vazquez Cortes, Research Unit Technician

San To Chan, Research Unit Technician

Satoshi Fujii, Visiting Researcher, National Institute of Technology, Okinawa College

Gai Wu, Visiting Researcher, Wuhan University

Yichao Chen, Visiting Researcher, University of Houston

Sharada Govinda, Visiting Researcher

Meissha Ayu Ardini, Visiting Researcher

Fernando Duda, Visiting Researcher, Federal University Rio De Janeiro

Mai Barnes, Research Unit Administrator

Akyl Shakir, PhD Student

Geoffrey Acoba Garcia, PhD Student

Luca Lombardo, Research Intern

Maxence Emile Brillouet, Research Intern

Alexander Milton Lundh, Research Intern

Scholarly Contributions and Creative Productions (by Faculty)

Journal Article

1. Pastore, A.; Grillo, A.; Fried, E.
Internal Constraints and Gauge Relations in the Theory of Uniaxial Nematic Elastomers. *Journal of Elasticity* 2025, 158, 10-1–42.
2. Boni, C.; Fried, E.; Royer-Carfagni, G.
Kinematic and Static Characterization of Everting Möbius Kaleidocycles with Slightly Incongruent Links. *Mechanism and Machine Theory* 2025, 216, 106185-1–21.
3. Podio-Guidugli, P.; Fried, E.
On the Assessment of Dissipation in Continuum Thermodynamics. *Zeitschrift für Angewandte Mathematik und Physik* 2025, 76, 204-1–14.
4. Chaurasia, V.; Fried, E.
Isometric and Isoenergetic Everting Motions of Orientable and Nonorientable Bands. *Journal of Nonlinear Science* 2025, 35, 82-1–27.
5. Janssens, S. D.; Forte Neto, F. S.; Vázquez-Cortés, D.; Duda, F. P.; Fried, E.
Probing Growth Precursor Diffusion Lengths by Inter-Surface Diffusion. *Computer Physics Communications* 2025, 314, 109671-1–11.
6. R. Fosdick, E. Fried.

Addendum to: "Dynamics of incompressible fluids with incompatible distortion rates", *International Journal of Engineering Science* **208** (2025), 104162-1–5.

7. S. Tiwari, E. Fried.

Characterization of an overlooked kinematical descriptor in the second-gradient hyperelastic theory for thin shells, *Journal of Elasticity* **157** (2025), 9-1–27.

Presentation at Conference

1. Fried, E.

Oxygen-Induced Self-Stress and Oscillatory Hydrogen Oxidation on Rhodium Thin Films. AmeriMech Symposium: Mechanics of Materials in Extreme Environments 2025.

2. Fried, E.

Inside out without Effort: The Geometry of Isometric Band Eversions. Recent Advances in Potential Theory and Partial Differential Equations 2025, OIST.

3. Fried, E.

Orthoschemes, Ortho -Circles, and Möbius Bands. The 3rd International Symposium of Molecular Science in Okazaki 2025.

Seminars

1. Fried, E.

Mass–Momentum Velocity Disparity in Compressible Fluid Flow. OIST-KEIO Showcase Talk Series 10, Diverse Approaches to Fluid Dynamics at OIST.

2. Fried, E.

From Underconstrained Linkages to Möbius Bands: Isometric, Isoenergetic Pathways of Eversion. OIST-Keio Showcase Talk Series 8, Science Meets Society: Twist, Flow, and Instability 2025 at Keio University.

3. Fried, E.

Inside out without Effort: Exceptional Linkages and the Geometry of Isometric Band Eversions. Special seminar hosted jointly by Mechanical Engineering and Mathematical Science, 2025 at New Jersey Institute of Technology (NJIT).

4. Fried, E.

From Underconstrained Linkages to Möbius Bands: Isoenergetic Pathways of Eversion. Princeton Mechanical and Aerospace Engineering Special Guest Seminar, 2025 at Princeton University.

5. Fried, E.

Representing General Three-Dimensional States of Residual Stress. CEEM SEMINAR SERIES, 2025 at Columbia University.

6. Fried, E.

Stable Möbius Bands via Isometric Deformations of Circular Helicoids. MechSE Seminars, 2025 at the University of Illinois Urbana-Champaign.

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
David Vazquez Cortes	Journal Article	Laser stealth dicing of β -Ga ₂ O ₃ : Theoretical and experimental studies	Journal of Materials Science & Technology	Elsevier	2025

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
D. Vazquez Cortes, S. Janssens	Journal Article	Theoretical predictions of beryllium-vacancy color centers in diamond, Diamond and Related Materials	Diamond & Related Materials	Elsevier	2025
David Vazquez Cortes	Journal Article	Exploring atomic structural evolution and mechanical properties of AlN during laser stealth dicing through molecular dynamics	Materials Science in Semiconductor Processing	Elsevier	2025
David Vazquez-Cortes	Poster Presentation at Conference	Approach for measuring diffusion lengths of growth precursors on diamond	Hasselt Diamond Workshop 2025 - SBDD XXIX		
S. Janssens, D. Vazquez Cortes	Poster Presentation at Conference	Direct laser writing of high aspect ratio nanochannels for nanofluidics	OIST-Keio Showcase Talk Series Vol. 10, Diverse Approaches to Fluid Dynamics, OIST		
Ariel Boiardi	Poster Presentation at Conference	Biomimetic hydrogel swimmer driven by flutter instability	OIST-Keio Showcase Talk Vol. 10 - Diverse Approaches to Fluid Dynamics		
David Vasquez-Cortes	Poster Presentation at Conference	Understanding the effect of flow rate on the deposition rate of diamond films by plasma-enhanced chemical vapor deposition.	Hasselt Diamond Workshop 2025 - SBDD XXIX		
Vishesh Bhat	Poster Presentation at Conference	Developable bands from polyhedral precursors	Evolving Design and Discrete Differential Geometry - towards Mathematics Aided Geometric Design" (CREST ED3GE) supported by the JST CREST Program		
S. Janssens, D. Vazquez Cortes	Poster Presentation at Conference	Exploring the Memory Effect in Plasma-Enhanced Chemical Vapor Deposition of Diamond	the 18th International Conference in New Diamonds and Nanocarbons NDNC 2025		
Vishesh Bhat	Presentation at Conference	A topological tale, served with a twist: symmetry and orientability design in flat twisted bands	OIST Internal Seminar Series		
David Vazquez-Cortes	Presentation at Conference	Flow Rate Optimization: Improving Methane-to-Diamond Transformation Efficiency	2024 Asian-APC		
David Vazquez Cortes	Presentation at Conference	Parasitic deposition in microwave plasma chemical vapor deposition	The 86th JSAP Autumn Meeting 2025		
Stoffel Janssens	Presentation at Conference	Approach for measuring diffusion lengths of growth precursors on diamond	18th International Conference on New Diamond and Nano Carbons		
Stoffel Janssens	Presentation at Conference	Direct formation of high-aspect-ratio nanochannels by laser writing	The 10th Asian Applied Physics Conference		

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Stoffel Janssens	Presentation at Conference	Measuring diffusion lengths of growth precursors on diamond	2025 International Conference on Diamond Materials and Applications		
Stoffel Janssens	Presentation at Conference	Direct laser writing of diamond-based nanochannels and their integration into nanofluidic devices	Hasselt Diamond Workshop – SBDD XXX		
Stoffel Janssens	Presentation at Conference	Probing growth precursor diffusion lengths by inter-surface diffusion	The Eleventh JSME-KSME Thermal and Fluids Engineering Conference (J-K TFEC11)		
David Vazquez Cortes	Presentation at Conference	Optical quality of diamond thin films studied by spectroscopic ellipsometry	The JSAP Kyushu Chapter Annual Meeting 2025		
Vishesh Bhat	Presentation at Conference	A dual design recipe for developable bands	Evolving Design and Discrete Differential Geometry - towards Mathematics Aided Geometric Design” (CREST ED3GE) supported by the JST CREST Program		
Ariel Boiardi	Seminars	Nonreciprocal dynamics of active structures	OIST		

External Service

Term 1 2023 - Ongoing	Editor-in-Chief, Journal of Elasticity
Term 1 2022 - Ongoing	Editorial Board Member, Journal of Engineering Mathematics
Term 1 2021 - Ongoing	Editor, Mechanics of Materials
Term 1 2020 - Ongoing	Editorial Board Member, Solids
Term 1 2020 - Ongoing	Editorial Board Member, International Journal of Molecular Sciences
Term 1 2020 - Term 1 2025	Editorial Board Member, Forces in Mechanics
Term 1 2017 - Ongoing	Senior Editor, Journal of Nonlinear Science
Term 1 2017 - Ongoing	Editorial Board Member, Transactions of Mathematics and its Applications
Term 1 2012 - Ongoing	Editorial Board Member, Mechanica
Term 1 2005 - Ongoing	Editorial Board Member, Mechanics and Mechanics of Solids

Outreach Activities [For Unit Members Only]

Term 1 2025	San To Chan, Development of metrics to measure structural qualities of art, X.com
Term 1 2025	San To Chan, Development of metrics to measure structural qualities of art, KAI-YOU
Term 1 2025	San To Chan, Development of metrics to measure structural qualities of art, INSIDE

Workshops and Seminars [Organized and Hosted by Faculty/Units]

Speaker Name(s)	Title	Location	Date
Anindaya Chatterjee	In-Plane Oscillations of a Slack Catenary Using Assumed Modes.	C700, Lab3, OIST	2026-03-04
Flavia Libonati	From Bone to Diatoms: Nature's Blueprint for Multifunctional Lightweight Structures.	C700, Lab3, OIST	2025-11-20
Bohuslav Rezek	Visible frequency Plasmonic Effects in Graphene and Diamond Heterostructures.	D23, Lab5, OIST	2025-07-22
Dr. Satoshi Takada	Revisiting Stress Propagation in a Two-Dimensional Circular Disk and a Three-Dimensional Sphere Under Diametric Loading.	F01, Lab4, OIST	2025-03-27
Dr. Jyunichiro Kishine	Lattice Vibrations in Chiral Materials: Bridging Condensed Matter Physics and Mechanical Engineering.	D23, Lab5, OIST	2025-02-27
Andrew Chapman	Energy Analysis, Energy Transitions and Policy Hurdles: Toward Circularity.	C210, Center Building, OIST	2024-11-11
Johannes Hafner	Grasshopper Workshop	OIST	2024-09-09