

Unit Name

Mechanics, and Materials Unit

Collaborations

Fernando Duda, Professor, Federal University of Rio de Janeiro in Brazil, Probing growth precursor diffusion lengths by inter-surface diffusion

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

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

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

Research Personnel

Stoffel Janssens, Senior Staff Scientist

Vikash Chaurasia, Postdoctoral Scholar, Delft University of Technology

Sankalp Tiwari, Postdoctoral Scholar

Garima, Research Unit Technician

Vishesh Bhat, Postdoctoral Scholar

San To Chan, Research Unit Technician

Michael Grunwald, Research Unit Technician

David Vazquez Cortes, Research Unit Technician

Satoshi Fujii, Visiting Researcher

Fernando Duda, Visiting Researcher, Federal University Rio De Janeiro

Yichao Chen, Visiting Researcher, University of Houston

Gai Wu, Visiting Researcher

Mai Barnes, Research Unit Administrator

Akyl Shakir, PhD Student

Geoffrey Acoba Garcia, PhD Student

Andrea Pastore, Research Intern

Meissha Ayu Ardini, Research Intern

Francisco De Souza Forte Neto, Research Intern

Soma Shimabukuro, Research Intern

Remi Hugues Redron, Research Intern

Ayman Alashkar, Research Intern

William Bart Sumners, Research Intern

Scholarly Contributions and Creative Productions (by Faculty)

Journal Article

1. Fosdick, R; Fried, E. "Addendum to: 'Dynamics of Incompressible Fluids with Incompatible Distortion Rates'." *International Journal of Engineering Science* 2025, 208, 104162 (5 pages).
<https://www.sciencedirect.com/science/article/pii/S0020722524001460>
2. Chan, S.; Fried, E. "Structural Stability and Thermodynamics of Artistic Composition." *Proceedings of the National Academy of Sciences of the United States of America* 2024, 121, e2406735121 (12 pages).
<https://dx.doi.org/10.1073/pnas.2406735121>
3. Tiwari, S.; Fried, E. "Characterization of an Overlooked Kinematical Descriptor in the Second-Gradient Hyperelastic Theory for Thin Shells." *Journal of Elasticity* 2024, 157, 9 (27pages).
<https://dx.doi.org/10.1007/s10659-024-10103-7>
4. Vázquez-Cortés, D.; Janssens, S.; Fried, E. "Controlling the Morphology of Polycrystalline Diamond Films via Seed Density: Influence on Grain Size and Film Texture." *Carbon* 2024, 228, 119298 (8 pages).
<https://dx.doi.org/10.1016/j.carbon.2024.119298>
5. Tiwari, S.; Fried, E. "Derivation, Characterization, and Application of Complete Orthonormal Sequences for Representing General Three-Dimensional States of Residual Stress." *Journal of the Mechanics and Physics of Solids* 2024, 190, 105729 (41 pages).
<https://dx.doi.org/10.1016/j.jmps.2024.105729>
6. Moreno, N.; Vázquez-Cortés, S.; Fried, E. "Sedimentation Dynamics of Triply Twisted Möbius Bands: Geometry Versus Topology." *Physical Review Research* 2024, 6, 033141 (11 pages).
<https://dx.doi.org/10.1103/PhysRevResearch.6.033141>
7. Chaurasia, V.; Fried, E. "Stable Möbius Bands from Isometrically Deformed Circular Helicoids." *Journal of Elasticity* 2024, 155, 601–636.
<https://link.springer.com/article/10.1007/s10659-023-10008-x>
8. Fosdick, R.; Fried, E.; Man, C.-S. "Scholarly Works, Academic Lineage, and Doctoral Advisees of Jerald L. Ericksen." *Journal of Elasticity* 2024, 155, 5–16.
<https://doi.org/10.1007/s10659-023-10044-7>
9. Fosdick, R.; Fried, E.; Man, C.-S. "Foreword." *Journal of Elasticity* 2024, 155, 1–3.
<https://doi.org/10.1007/s10659-023-10046-5>
10. Chan, S.; Fried, E. "Marangoni Spreading on Liquid Substrates in New Media Art." *PNAS Nexus* 2024, 3, 1–12.
<https://doi.org/10.1093/pnasnexus/pgae059>

Presentation at Conference

1. Fried, E. "Orthoschemes, Ortho -Circles, and Möbius Bands." *The 3rd International Symposium of Molecular Science in Okazaki* 2025.
2. Fried, E. 2024. "Complete Orthonormal Sequences for Representing General Three-Dimensional States of Residual Stress." *2024 NZMS, AMS, AustMS Joint Conference* 2024.
3. Fried, E. "Chemical Pattern Formation on the Surface of an Elastic Solid." *2024 NZMS, AMS, AustMS Joint Conference* 2024.
4. Fried, E. "Shape-Preserving Everting Motions of Orientable or Nonorientable, Unkotted or Knotted, Bands." *2024 NZMS, AMS, AustMS Joint Conference* 2024.
5. Fried, E. "Everting Chiral Linkages and Their Continuum Limits." *OIST-JST-AIMR Joint International Symposium* 2024.
6. Fried, E. "Isometric and Isoenergetic Everting Motions of Elastic Binormal Scrolls with Closed Midlines." *STAMM 2024 Conference* 2024.

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Y.-C. Chen	Journal Article	A Mechanical Theory of Growth	Journal of Elasticity	Springer Nature	2024
Bhat, V.	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		
Vazquez-Cortes, D.	Poster Presentation at Conference	Approach for measuring diffusion lengths of growth precursors on diamond	Hasselt Diamond Workshop 2025 - SBDD XXIX		
Vasquez-Cortes, D.	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		
Janssens, S.	Presentation at Conference	Indications for long migration lengths of growth precursors on diamond	French Japanese Workshop on Diamond Electronic Devices, Village Cap Estérel, France		
Vazquez-Cortes, D.	Presentation at Conference	Introduction of the Mechanics and Materials Unit at OIST	JSAP networking seminar, Spring		
Vazquez-Cortes, D.	Presentation at Conference	Flow Rate Optimization: Improving Methane-to-Diamond Transformation Efficiency	2024 Asian-APC		
Janssens, S.	Presentation at Conference	Direct femtosecond laser writing of nanochannels	The 9th Asian Applied Physics Conference (Asian-APC)		
Bhat, V.	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		
Vazquez-Cortes, D.	Seminars	Towards Understanding Diamond Deposition: Insights from the Mechanics and Materials Unit at OIST	Center for Emergent Matter Science, RIKEN		
Vazquez-Cortes, D.	Seminars	Investigación en la Unidad de Mecánica y Materiales	CIACyT, UASLP		
Vazquez-Cortes, D.	Seminars	Investigación en la Unidad de Mecánica y Materiales	Optical Communication Research Institute, UASLP		
Bhat, V.	Seminars	The mathematics and mechanics of M-"obius bands	Invited talk at National Institute of Technology, Surathkal, India.		

External Service

2023-09-01 - Ongoing Editor-in-Chief, Journal of Elasticity

2022-09-01 - Ongoing Editorial Board Member, Journal of Engineering Mathematics

2021-09-01 - Ongoing	Editor, Mechanics of Materials
2020-09-01 - Ongoing	Editorial Board Member, Solids
2020-09-01 - Ongoing	Editorial Board Member, International Journal of Molecular Sciences
2020-09-01 - Ongoing	Editorial Board Member, Forces in Mechanics
2017-09-01 - Ongoing	Editorial Board Member, Journal of Nonlinear Science
2017-09-01 - Ongoing	Editorial Board Member, Transactions of Mathematics and its Applications
2012-09-01 - Ongoing	Editorial Board Member, Mechanica
2005-09-01 - Ongoing	Editorial Board Member, Mechanics and Mechanics of Solids

Workshops and Seminars (Organized and Hosted by Faculty/Units)

Speaker Name(s)	Title	Location	Date
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
Dr. Jorge Puebla	Resonant absorption of surface acoustic waves in magnetic thin films	C700, Lab 3, OIST	2024-08-29
Dr. Tomohiro Furusato	Introduction of pulsed power engineering and discharge plasma in supercritical fluids	C700, Center Building, OIST	2024-08-19
Dr. Yuki Inada	Laser-Aided Diagnostic Technology for Discharge Plasma	C700, Center Building, OIST	2024-08-19
Dr. Brian Seguin	A smooth isometric immersion is determined by a framed curve	C209, Center Building, OIST	2024-04-17