Arun Kumar

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EXPERIENCE

Marie Skłodowska-Curie Actions (Europostdoc2) postdoctoral fellow at Ecole Polytechnique, Paris *February 2022 – April 2024*
Research Focus: Models for predicting instabilities in thin structures
Advisors: Prof. Basile Audoly (Ecole Polytechnique, Paris), Prof. Pedro Reis (EPFL, Laussane)

Research Engineer at INRIA, Grenoble *Current*
Research Focus: Mechanics of wisping and tangling of human hairs

EDUCATION

Indian Institute of Science, Bengaluru, India *July 2016 – April 2022*
PhD in Mechanical Engineering
Research Focus: Elastic ribbons — experimental investigations, simulations, and a ribbon model
Advisor: Prof. Ramsharan Rangarajan

National Institute of Technology, Calicut, India *July 2014 – June 2016*
Master of Technology in Machine Design
Project: Frequency response of base-excited cantilever in fluid medium

Jawaharlal Nehru Engineering College, Himachal Pradesh, India *July 2010 – June 2014*
Bachelor of Technology in Mechanical Engineering

PUBLICATIONS

Wavelength selection in the twist buckling of pre-strained elastic ribbons,
A Kumar, B Audoly,
Journal of the Mechanics and Physics of Solids, https://doi.org/10.1016/j.jmps.2024.106005

Asymptotic derivation of a higher-order one-dimensional model for tape springs,
A Kumar, B Audoly, C Lestringant,
Philosophical Transactions of the Royal Society A, https://doi.org/10.1098/rsta.2022.0028

An investigation of models for elastic ribbons: Simulations & experiments,
A Kumar, P Handral, D Bhandari, A Karmakar, and R Rangarajan,
Journal of the Mechanics and Physics of Solids, https://doi.org/10.1016/j.jmps.2020.104070

More views of a one-sided surface: Mechanical models and stereovision techniques for Moebius strips,
A Kumar, P Handral, D Bhandari, and R Rangarajan,

Proceedings of the Royal Society A, https://doi.org/10.1098/rspa.2021.0076

A pragmatic approach to modeling elastic ribbons.
A Kumar, R Rangarajan,
Manuscript under preparation

PRESENTATIONS AND TALKS

Ribbons and tape springs: structures not too narrow, not too wide; LMS, Ecole Polytechnique, April 2024

Asymptotically derived models for thin structures; poster presentation, Europostdoc2 boot camp, June 2022.

An experimental investigations of models for elastic ribbons, short talk and poster presentation at **ICTAM 2021**.

Mechanics of elastic ribbons, **Best poster award** — IISc Mechanical Engineering Symposium, 2019.

On the modeling of elastic ribbons, **INCAM 2019**, Bengaluru, India.

Stretching an annular ribbon. A short talk — *my thesis in 3 minutes* — at **INCAM 2019**.

AWARDS AND DISTINCTIONS

Recipient of Marie Skłodowska-Curie Actions (Europostdoc2) postdoctoral fellowship from February 2022 to April 2024.

Received first prize for our work in the **technical video contest** — IISc Mechanical Engineering Symposium, 2018.

Ranked 121 among 1.3 lakh students in CSIR NET 2014 (national exam for graduate students).

Silver medal (ranked second) in HIMUTKARSH 2006 talent search examination.
HIMUTKARSH is a state-level exam for school students.

Region topper, National Science Olympiad 2008.

Recipient of Himachal Pradesh education board merit scholarship (2006 – 2009).

TEACHING EXPERIENCE

Teaching Assistant, Finite Element Method *January – June 2020*
IISc, Mechanical Engineering
Taught FEM implementation in C++.

Teaching Assistant, CAD Lab *Fall 2015*
NIT Calicut, Mechanical Engineering
Taught CREO and SOLIDWORKS to undergraduate and first year M.Tech students.

INTERNSHIPS

National Thermal Power Corporation, Kol Dam, Himachal Pradesh, India *June – July 2013*
Simulated loading of vertical flood gates.

Hindustan Machine Tools, Pinjore, India *June 2012*
Proposed design modifications for HMT's tractor trolley hook.

COMPUTING SKILLS

C++
Linux and MacOS
Abaqus, Ansys
FENICS
Experience with OpenMP and MPI
PETSc
Adobe Illustrator and Photoshop
Mathematica

OTHERS

Outreach — Secretary at IISc SIAM student chapter *2019 – 2022*
Organized yearly talks.

Redesigned postbox for India Post.
Minor project at NIT Calicut.

Co-edited Reflexia 2014, annual magazine of undergraduate college.

Reviewed a manuscript for Journal of the Mechanics and Physics of Solids.

REFERENCES

Basile Audoly *Postdoc advisor*
Professor, Laboratoire de Mécanique des Solides, Ecole Polytechnique, Paris.
Email: basile.audoly@polytechnique.edu

Florence Bertails-Descoubes *Current advisor*
INRIA Researcher, ELAN team, INRIA Grenoble.
Email: florence.descoubes@inria.fr