

JOHN SEBASTIAN

johnseb@dtu.dk \diamond john-seb.github.io

Research Interests

Fluid Mechanics; Soft Matter and Biophysics; Applied and Computational Mathematics

Education

Technical University of Denmark (DTU) *2023 - Ongoing*
Doctor of Philosophy (Physics)
Soft Matter and Biophysics Group ([Jensen Research](#))

Ben-Gurion University of the Negev, Israel (BGU) *2021 - 2023*
Master of Science (Mechanical Engineering)
Fluid Mechanics Laboratory ([Green Lab](#))
Thesis: Electrical Circuit Modelling of Nanofluidic Systems

College of Engineering, Trivandrum (CET)
University of Kerala, India *2013 - 2017*
Bachelor of Technology (Mechanical Engineering)
Micro/Nanofluidics Laboratory ([RS Kumar Lab](#))
Thesis: Inverse Design of Short Span Hydrofoils

Publications

- **J Sebastian** and K H Jensen. “*The geometry of Nature’s stingers is universal due to stochastic mechanical wear*” [Proc. Natl. Acad. Sci. U.S.A. 123 \(10\) e2526098123 \(2026\)](#)
- **J Sebastian**, A L Schødt, K H Jensen. “*Experiments on a sphere settling towards a boundary in a viscous liquid under the influence of a magnetic force*” [Journal of Fluid Mechanics, 1024, A12 \(2025\)](#)
- **J Sebastian** and Y Green. “*Electrical Circuit Modelling of Nanofluidic Systems*”
(*On journal cover*) [Advanced Physics Research 2.10: 2300044 \(2023\)](#)

Manuscripts in preparation

- **J Sebastian**, H A Stone, K H Jensen. “*Electrokinetic constraints on intercellular signalling in plants*”

Honors and Awards

- Travel Award to attend APS Global Physics Summit *Otto Mønsted Fonden, 2025*
- Negev Fellowship for Outstanding Graduate Students in Engineering *BGU, 2022*
- The Macquarie Group Scholarship from edX *edX, 2021*

Teaching Experience

- Teaching Assistance + Guest lectures (on transport, electrokinetics):
Theoretical Microfluidics Graduate Course *DTU: 2023, 2024*
- Teaching Assistance: *Statistical Physics* Graduate Course *DTU: 2023, 2024*
- Theory lectures + Lab tutorials: *Wind tunnel testing of airfoils* Short Course *CET: 2017*

Professional Research Experience

MRF Tyres (Research & Development) *July 2017 - September 2020*
Research Engineer *Chennai, India*

- Computational modelling of tyre composites; development of functional geometric designs and materials
- Image analysis methods to estimate complex deformations at the tyre contact patch

- Reverse engineered the complex shape and material characteristics of the tibial bone implant to arrive at an internal mesh structure suitable for 3D printing

Invited Talks

- “*Useful and Pointless Optima in Nature*” Biocomplexity Section, Niels Bohr Institute, Feb 2026
- “*Form v. Function through toy problems and actual toys*” Prakash Lab, Stanford, Nov 2025
- “*Traversing a thin film lubricant in finite time*” Alim Group, TU Munich, Aug 2024

Other Academic Research Projects

PD Pillars: Electrokinetic constraints on intercellular signalling in plants

Supervisors: Prof Kaare H. Jensen, Prof Howard Stone *manuscript in prep., 2026*

Soft Poiseuille: Nonlinear viscous flow response in soft compliant channels

Supervisors: Prof Kaare H. Jensen *2025*

phytoMaze: Anisotropic signal transport in plant tissue encoded by cellular architecture

Supervisors: Prof Kaare H. Jensen, Prof Johannes Liesche *2024*

Water Tetris: Drag invariance and invisible corners in polyomino plates

Supervisor: Prof Kaare H. Jensen *2023*

Surface Charge Regulation and its Effects on the Conductance of 2D nanochannels

Supervisor: Prof Yoav Green *May 2022 - March 2023*

Microswimmers in non-Newtonian fluids

Supervisor: Prof Roiy Sayag *March 2022 - July 2022*

Design of Short Span Hydrofoils

Supervisor: Prof Ranjith S Kumar *Bachelor’s Thesis, 2017*

Rapid and Low- Cost Fabrication of Expendable Microfluidic Devices

Supervisor: Prof Ranjith S Kumar *Micro/nanofluidics Research Laboratory, 2016*

Conference Presentations

- **J Sebastian**, K H Jensen. “*Electrokinetic constraints on intercellular signalling in plants*” APS DFD (Houston, USA – November 2025)
- **J Sebastian**, K H Jensen. “*Geometric flows shaping universal geometries*” Complex Motion in Fluids – CMIF (Île d’Oléron, France – July 2025) *Poster*
- **J Sebastian**, K H Jensen. “*Random wear shapes all pointed things alike*” The Art and Science of Liquid Interfaces (Zurich, Switzerland – March 2025) *Poster*
- **J Sebastian**, K H Jensen. “*Random wear shapes all pointed things alike*” APS Global Summit (LA, USA – March 2025)
- **J Sebastian**, A L Schødt, K H Jensen. “*Traversing a thin film lubricant in finite times*” Complexity of Life Conference (Graz, Austria – September 2024) *Poster*
- **J Sebastian**, A L Schødt, K H Jensen. “*Traversing a thin film lubricant in finite times*” Plant Biomechanics UK (Cambridge, UK – April 2024) *Poster*
- **J Sebastian**, A L Schødt, K H Jensen. “*Traversing a thin film lubricant in finite times*” APS March Meeting 2024 (Minneapolis, USA – March 2024)
- **J Sebastian** and Y Green. “*Can nanofluidic systems be described by a simple electrical circuit?*” 6th Physics of Membrane Processes Workshop - PMP 2023 (Online – November 2023)
- **J Sebastian** and Y Green. “*Understanding the Conductance of Nanoslits*” Israel Society for Theoretical and Applied Mechanics, Annual Conference, (Technion, Israel – Dec 2022)
- **J Sebastian** and Y Green*. “*Electrical Circuit Modelling of Nanofluidic Systems*” 75th Annual Meeting of the APS DFD 2022 (Indianapolis, USA – November 2022) (*Presented by YG)

- **J Sebastian** and Y Green. “*Electrical Circuit Modelling of Nanofluidic Systems*” 5th International Symposium on Physics of Membrane Processes - PMP 2022 (Wageningen, Netherlands – October 2022)
- **J Sebastian** and Y Green. “*Electrical Circuit Modelling of Nanofluidic Systems*” 14th International Symposium on Electrokinetics - ELKIN 2022 (Tel Aviv, Israel – July 2022) *Poster + Soundbite*
- **J Sebastian** and Y Green. “*Multichannel Nanofluidic Systems: The Equivalent Electrical Circuit*” International Water Summit (Sde Boker, Israel – May 2022)
- **J Sebastian** and Y Green. “*Multichannel Nanofluidic Systems: The Equivalent Electrical Circuit*” 67th Annual Meeting of the Israel Physical Society (IPS) (Be’er Sheva, Israel – February 2022)
- **J Sebastian** and Y Green. “*The Equivalent Electrical Circuit of Multichannel Nanofluidic Systems*” Israel Society for Theoretical and Applied Mechanics, Annual Conference, (Tel Aviv, Israel – December 2021)
- **J Sebastian** and Y Green. “*Multichannel Nanofluidic Systems: The Equivalent Electrical Circuit*” Nano Israel 2021 (Jerusalem, Israel – October 2021)

Leadership and Mentorship Roles (Outreach activities)

- **Organiser of weekly FLUIDS Friday Seminars at DTU Physics** *2023 - 2026*
- Seminar invitations have led to collaborations with the section.
- **Panelist, Roundtable Discussion on Irreproducibility in Scientific Research** *14 Mar 2022*
- INTERNATIONAL WORKSHOP: The Problem of Irreproducibility in Scientific Experimentation: Is there a “Replication Crisis”?
BGU, Israel
- **Member, History and Philosophy of Science Club** *Nov 2021 - Mar 2022*
- Presented analyses of historical texts at various meetings
BGU, Israel
- **Member, Emergency Design Collective (EDC)** *Jun 2020 - Jul 2021*
- Part of a global team of problem solvers working together to mitigate new challenges in the wake of the COVID-19 pandemic
- Nominated to top three projects under “Pandemic Era Educational Challenges”
- **Student Coordinator, Innovation Center CET** *2016 - 17*
- Coordinated weekly meetings, brainstorming sessions and training programs in the state-run facility
- Organised the first undergraduate thesis project expo, *Innov-EXPO* in May 2017
- **Bosch Student Ambassador** *2016 - 17*
- Coordinated research collaboration, projects and student placements
- **Project Coordinator, Society of Automotive Engineers (SAE)** *2015 - 16*
- Launched and mentored eight projects and maximized participation in national design competitions

Selected Achievements (Academic adjacent)

- Institute Topper - IET PATW 2016 Presentation Competition “*Microfluidics for the Future*”
Institution of Engineering and Technology (IET)- Present Around The World (PATW)
- Founded CETALKS, an in- campus talk show in 2015
- Attended Indian Science Congress 2010 as Invited Student Delegate

Extra Curricular Engagement

- Photography (One of the final 5 Yuujou travel photographers out of 30,000 global photographers in 2019; World Photography Club (WPC) Cover Photo, 2022)
- DIY Microscopy, Origami, Stand up comedy