

Hadrien Oliveri

Postdoctoral researcher

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Employment History

- 03/2024 – ... **ELBE Postdoctoral Research Fellow**
Center for Systems Biology Dresden, Max Planck Institute of Molecular Cell Biology and Genetics.
2/3-year independent postdoctoral position starting in March 2024.
- 10/2023 – 02/2024 **Postdoctoral Researcher**
Center for Systems Biology Dresden, Max Planck Institute of Molecular Cell Biology and Genetics.
Supervisor: Prof. Heather Harrington.
- 09/2019 – 10/2023 **Postdoctoral Research Associate**
Mathematical Institute, University of Oxford.
Supervisors: Prof. Alain Goriely (Sep 2019 – Jun 2023); Prof. Heather Harrington (Jul 2023 – Oct 2023)

Education

- 2015 – 2019 **Ph. D., University of Montpellier / Inria / ENS Lyon**
Computer Science.
Defended on 28 May 2019
Thesis title: *On the role of mechanical feedback in plant morphogenesis*.
Advisors: Dr Christophe Godin, Dr Jan Traas
- 2012 – 2015 **M. Eng., Grenoble Institute of Technology**
Computer Science and Applied Mathematics (*Ensimag*).
Thesis title: *Virtual pre-operative planning of acetabular fracture reduction using a patient-specific biomechanical model*.
- 2010 – 2012 **Classes préparatoires aux grandes écoles (Lycée Vaugelas, Chambéry)**
Mathematics and Physics.
Two-year preparation for national competitive entrance exams leading to French *grandes écoles*, specialising in mathematics and physics. Ranked 309th among 6938 candidates at the *concours communs polytechniques*.

Skills

- Languages **French** (mother tongue), English (bilingual), Italian (bilingual), German (notions)
- Coding **Wolfram Mathematica**, Python, \LaTeX
- Mathematics **Solid mechanics**, mechanics of slender structures, dynamical systems, asymptotics, ordinary and partial differential equations, scientific computing

Teaching and supervision

- Tutorials **Tutor for first-year *Dynamics***, Somerville College, University of Oxford, 8 hours, 6 students (2022).
- Tutor for fourth-year *Solid Mechanics***, Mathematical Institute, University of Oxford, 6 hours, 15 students (2021).

Teaching and supervision (continued)

- Supervision
- **Group supervisor for *Case Studies in Mathematical Modelling***, Mathematical Institute, University of Oxford, 8 hours, 5 students (2022).
 - **Group supervisor for *Case Studies in Mathematical Modelling***, Mathematical Institute, University of Oxford, 8 hours, 5 students (2021).
 - **PhD assistant supervisor**, assisting Prof. Alain Goriely in the supervision of 4 PhD students: weekly meetings, technical and scientific advising, design of research strategy & scientific writing.
 - **Study group co-supervisor** Workshop *Modeling Shape and Size in Biological Development* (Lorentz Centre, Leiden, 2020).
- Marking
- **Examiner for first-year *Geometry* final exam**, Mathematical Institute, University of Oxford (2022).
 - **Examiner for fourth-year *Networks Mini-projects***, Mathematical Institute, University of Oxford (2021)

Miscellaneous Experience

Certifications

- 2024
- **Qualification de droit commun** Required certification to apply for a teaching position in a French University (*maître de conférences, professeur des universités*).

Awards and Achievements

- 2022
- **Recognition Award** for outstanding performance, Mathematical Institute, University of Oxford.
- 2021
- **Best ECR talk prize** at the 6th *Oxford International Neuron and Brain Mechanics Workshop*, awarded by Elsevier.

Grants and fellowships

- 2021 – 2023
- **Fulford Junior Research Fellowship** (non-stipendiary), Somerville College, University of Oxford.
- 2014 – 2015
- **Erasmus+ scholarship**, 9 month exchange with *Politecnico di Torino*.

Other academic service

- Outreach
- **Oxford Maths Festival**, Public demonstrations of mathematical experiments to children (2023).
 - **A slice of Science**, Department of Archaeology, University of Oxford, Public talk (pub), Oxford (2023)
 - **JRF Research Forum**, talk, Somerville College, University of Oxford (2022).
 - **JRF Research Forum**, talk, Somerville College, University of Oxford (2021).
- Administration
- **Co-organiser of the *Industrial and Applied Mathematics Seminar series***, Mathematical Institute, University of Oxford (2022–2023).
 - **Co-organiser of the *Oxford Brain Modelling Seminar series***, Mathematical Institute, University of Oxford (2022).

Miscellaneous Experience (continued)

■ **Panel member** for the recruitment of a postdoctoral researcher, Mathematical Institute, University of Oxford (2021).

Peer-reviewing ■ **Peer-reviewer** for *PNAS* (1 review), *Physical Review Letters* (1 review), *Physical Review E* (2 reviews), *PLoS Computational Biology* (2 reviews) and *Brain Multiphysics* (3 reviews).

Research Publications

* These authors contributed equally

Journal Articles

- 1 D. E. Moulton and **H. Oliveri**, “The mathematics and mechanics of tug of war,” *Mathematics and Mechanics of Solids*, vol. 0, no. 0, Jan. 2024. [DOI: 10.1177/10812865231203154](https://doi.org/10.1177/10812865231203154).
- 2 G. S. Brennan, T. B. Thompson, **H. Oliveri**, M. E. Rognes, and A. Goriely, “The role of clearance in neurodegenerative diseases,” *SIAM Journal on Applied Mathematics*, vol. 0, no. 0, S172–S198, Jul. 2023. [DOI: 10.1137/22M1487801](https://doi.org/10.1137/22M1487801).
- 3 D. E. Moulton, **H. Oliveri**, A. Goriely, and C. J. Thorogood, “Mechanics reveals the role of peristome geometry in prey capture in carnivorous pitcher plants (*Nepenthes*),” *Proceedings of the National Academy of Sciences of the United States of America*, vol. 120, no. 38, e2306268120, Sep. 2023, **featured on cover and issue’s highlights**. [DOI: 10.1073/pnas.2306268120](https://doi.org/10.1073/pnas.2306268120).
- 4 P. Putra, **H. Oliveri**, T. Thompson, and A. Goriely, “Front propagation and arrival times in networks with application to neurodegenerative diseases,” *SIAM Journal on Applied Mathematics*, vol. 83, no. 1, pp. 194–224, Feb. 2023. [DOI: 10.1137/21M1467547](https://doi.org/10.1137/21M1467547). eprint: <https://doi.org/10.1137/21M1467547>.
- 5 **H. Oliveri** and A. Goriely, “Mathematical models of neuronal growth,” *Biomechanics and Modeling in Mechanobiology*, vol. 21, pp. 89–118, Jan. 2022, ISSN: 1617-7940. [DOI: 10.1007/s10237-021-01539-0](https://doi.org/10.1007/s10237-021-01539-0).
- 6 **H. Oliveri**, R. de Rooij, E. Kuhl, and A. Goriely, “Rheology of growing axons,” *Physical Review Research*, vol. 4, no. 3, p. 033 125, Aug. 2022. [DOI: 10.1103/PhysRevResearch.4.033125](https://doi.org/10.1103/PhysRevResearch.4.033125).
- 7 M. Boudissa, G. Bahl, **H. Oliveri**, M. Chabanas, and J. Tonetti, “Virtual preoperative planning of acetabular fractures using patient-specific biomechanical simulation: A case-control study,” *Orthopaedics & Traumatology: Surgery & Research*, vol. 107, no. 6, p. 103 004, 2021. [DOI: https://doi.org/10.1016/j.otsr.2021.103004](https://doi.org/10.1016/j.otsr.2021.103004).
- 8 M. Boudissa, B. Noblet, G. Bahl, *et al.*, “Planning acetabular fracture reduction using a patient-specific biomechanical model: A prospective and comparative clinical study,” *International Journal of Computer Assisted Radiology and Surgery*, vol. 16, pp. 1305–1317, 2021. [DOI: 10.1007/s11548-021-02352-x](https://doi.org/10.1007/s11548-021-02352-x).
- 9 **H. Oliveri**, K. Franze, and A. Goriely, “Theory for Durotactic Axon Guidance,” *Physical Review Letters*, vol. 126, no. 11, p. 118 101, Mar. 2021, **featured in issue’s highlights**. [DOI: 10.1103/PhysRevLett.126.118101](https://doi.org/10.1103/PhysRevLett.126.118101).
- 10 D. E. Moulton, **H. Oliveri**, and A. Goriely, “Multiscale integration of environmental stimuli in plant tropism produces complex behaviors,” *Proceedings of the National Academy of Sciences of the*

United States of America, vol. 117, no. 51, pp. 32 226–32 237, Dec. 2020. [DOI](#): 10.1073/pnas.2016025117.

- 11 F. Zhao*, F. Du*, **H. Oliveri***, *et al.*, “Microtubule-mediated wall anisotropy contributes to leaf blade flattening,” *Current Biology*, vol. 30, no. 20, pp. 3972–3985, Sep. 2020. [DOI](#): 10.1016/j.cub.2020.07.076.
- 12 O. Ali, **H. Oliveri**, J. Traas, and C. Godin, “Simulating turgor-induced stress patterns in multilayered plant tissues,” *Bulletin of mathematical biology*, pp. 1–23, 2019. [DOI](#): <https://doi.org/10.1007/s11538-019-00622-z>.
- 13 M. Boudissa, **H. Oliveri**, M. Chabanas, and J. Tonetti, “Computer-assisted surgery in acetabular fractures: Virtual reduction of acetabular fracture using the first patient-specific biomechanical model simulator,” *Orthopaedics & Traumatology: Surgery & Research*, vol. 104, no. 3, pp. 359–362, 2018. [DOI](#): 10.1016/j.otsr.2021.103004.
- 14 **H. Oliveri**, J. Traas, C. Godin, and O. Ali, “Regulation of plant cell wall stiffness by mechanical stress: A mesoscale physical model,” *Journal of mathematical biology*, vol. 78, no. 3, pp. 625–653, 2018. [DOI](#): 10.1007/s00285-018-1286-y.

Preprints

- 1 **H. Oliveri**, D. E. Moulton, H. A. Harrington, and A. Goriely, *Active shape control by plants in dynamic environments*, In review, 2023. [DOI](#): 10.48550/arXiv.2309.08950.

Conference Proceedings

- 1 M. Boudissa, M. Chabanas, G. Bahl, **H. Oliveri**, and J. Tonetti, “Virtual pre-operative planning in acetabular surgery using a patient-specific biomechanical model: A prospective clinical study,” in *CAOS 2020. The 20th Annual Meeting of the International Society for Computer Assisted Orthopaedic Surgery*, 2020.
- 2 M. Boudissa, **H. Oliveri**, M. Chabanas, P. Merloz, and J. Tonetti, “Pre-operative planning in acetabular surgery: The first patient-specific biomechanical model,” in *International Society of Computer-Assisted Orthopaedic Surgery, 17th Annual Scientific Meeting, Aachen, June 2017*, vol. 99-B, 2017, pp. 18–18. [DOI](#): 10.1302/1358-992X.2017.20.018.
- 3 **H. Oliveri**, M. Boudissa, J. Tonetti, and M. Chabanas, “Planning acetabular fracture reduction using patient-specific multibody simulation of the hip,” in *Medical Imaging 2017: Image-Guided Procedures, Robotic Interventions, and Modeling*, R. J. W. III and B. Fei, Eds., International Society for Optics and Photonics, vol. 10135, SPIE, 2017, 101352P. [DOI](#): 10.1117/12.2250380.
- 4 M. Boudissa, M. Chabanas, **H. Oliveri**, and J. Tonetti, “Virtual fracture reduction of the acetabulum using a rigid body biomechanical model,” in *SURGETICA*, 2014.

Talks and Posters

- 1 “The mathematics and mechanics of plant tropisms,” Max Planck Institute for Plant Breeding Research (**Invited**), 2024.
- 2 “Active shape control by plants in dynamic environment,” *Oxford Cancer: Spatial Biology Workshop* (Poster), Oxford, 2023.
- 3 “The mathematics and mechanics of plant tropisms,” Max Planck Institute for the Physics of Complex Systems (**Invited**), 2023.
- 4 “Tropism in living filaments: From plants to neurons,” EPFL (**Invited**), Lausanne, 2023.

- 5 “A field theory for plant tropism,” Workshop *Multiscale Modeling of Plant Growth, Pattern Formation, and Actuation*, Banff International Research Station, Casa Matemática, Oaxaca (**Invited**), 2022.
- 6 “A field theory for plant tropism,” Université Libre de Bruxelles (**Invited**), Bruxelles, 2022.
- 7 “A field theory for plant tropism,” 10th International Plant Biomechanics Conference, Lyon, 2022.
- 8 “A field theory for plant tropism,” Workshop *Mechanics of Life*, Flatiron Institute, New York, 2022.
- 9 “A field theory for plant tropism,” Symposium of the French “groupement de recherche” on Plant Physics (PhyP), Carry-le-Rouet, 2022.
- 10 “An optic ray theory for nerve durotaxis,” EMMC18, Oxford, 2022.
- 11 “Rheology of growing axons,” Workshop *Bridging the Gap: from Brain Mechanics to Brain Dynamics*, Lorentz Centre, Leiden, 2022.
- 12 “Tropism in living filaments: From plants to neurons,” Queen’s University Belfast (**Invited**), Belfast, 2022.
- 13 “A multiscale mathematical theory for plant tropism,” Department of Mathematical Sciences (**Invited**), University of Durham, Durham, 2021.
- 14 “An optic ray theory for nerve durotaxis,” 5th Soft Tissue Modelling Workshop, Glasgow, 2021.
- 15 “An optic ray theory for nerve durotaxis,” Industrial and Applied Mathematics Seminar Series, Mathematical Institute (**Invited**), University of Oxford, Oxford, 2021.
- 16 “An optic ray theory for nerve durotaxis,” 6th Oxford International Neuron and Brain Mechanics Workshop, Oxford, 2021.
- 17 “Morphogenesis of plant organs: Understanding the emergent behavior of stress-sensing tissues,” 9th International Plant Biomechanics Conference, Montreal, 2018.
- 18 “Stress-based regulation of multicellular plant growth: A finite element modeling approach applied to planar leaf morphogenesis,” 19th International Conference on Systems Biology (Poster), Lyon, 2018.
- 19 “Force-sensing at the cell wall: A multiscale physical model,” Symposium of the French “groupement de recherche” on Plant Physics (PhyP), Marseille, 2017.