Jonathan Fouchard

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Education

2009–2012 **PhD Biological physics**, Université Paris Diderot - Paris 7 (France), Department of Physics.

2009 **Master's degree Physics of biological systems**, Université Paris Diderot / Orsay (France).

2006–2009 **Magistère of Physics and engineering (Higher level university diploma)**, Université Paris Diderot - Paris 7 (France).

Research experience

2020 - now **Chargé de recherche CNRS**, Multi-scale dynamics of soft fibrous tissues
Laboratoire de Biologie du Développement, IBPS, CNRS / Sorbonne université, France
Equipe : Dr Delphine Duprez (DR CNRS)

2015 - 2019 **Research associate**, Flows and folds in living cell sheets
London Center for Nanotechnology, University College London, UK
Supervision : Pr Guillaume Charras

2013-2015 **Post-doctoral fellow**, Analysis and modeling of chromosome movements in fission yeast mitosis
CBI, CNRS / Université Paul Sabatier - Toulouse 3, France
Supervision : Dr Sylvie Tournier (DR CNRS)

2009-2012 **PhD applicant**, 3D traction forces and dynamics of focal adhesions in single cell mechanosensing
Matière et Systèmes Complexes, Université Paris Diderot, France
Supervision : Pr Atef Asnacios

2008 **4 months internship**, Shear mechanical properties of articular cartilage
Laboratory of Atomic and solid state physics, Cornell University, USA - Supervision : Pr Itai Cohen

Scientific communications

Original research articles

2023 J. Duque, A. Bonfanti, **J. Fouchard**, E. Ferber, A. Harris, A. Kabla and G. Charras. Fracture in living cell monolayers, *bioRxiv*, 2023.01. 05.522736.

2022 A. Lisica, **J. Fouchard**, M. Kelkar, T. Wyatt, J. Duque, A-B Ndiaye, A. Bonfanti, B. Baum, A. Kabla and G. Charras. Tension at intercellular junctions is necessary for accurate orientation of cell division in the epithelium plane, *PNAS*, 119(49):e2201600119.

2020 **J. Fouchard**, T. Wyatt, A. Proag, A. Lisica, P. Recho, M. Suzanne, A. Kabla and G. Charras. Curling of epithelial monolayers reveals a coupling between active bending and tissue tension, *PNAS*, 117(17):9377-9383.

2020 T. Wyatt*, **J. Fouchard***, A. Lisica, N. Khalilgharibi, B. Baum, P. Recho, A. Kabla and G. Charras **equal contribution*. Actomyosin controls planarity and folding of epithelial monolayers during compression. *Nature Materials*, 19:109–117. *Commented in the same issue*: To buckle or not to buckle, U. Schwartz, 19:8–9.

2020 P. Recho, **J. Fouchard**, T. Wyatt, N. Khalilgharibi, G. Charras and A. Kabla. A tug-of-war between stretching and bending in living cell sheets, *Physical Review E*, 102, 012401.

2020 A. Bonfanti, **J. Fouchard**, N. Khalilgharibi, G. Charras and A. Kabla. A unified rheological model for cells and cellularised materials. *Royal Society Open Science*, 7:190920.

2019 N. Khalilgharibi, **J. Fouchard**, N. Asadipour, A. Harris, P. Mosaffa, Y. Fujita, A. Kabla, J. Munoz, M. Miodownik, and G. Charras. Stress relaxation in epithelial monolayers is controlled by actomyosin. *Nature Physics*, 15:839–847.

2017 T. Li, H. Mary, M. Grosjean, **J. Fouchard**, S. Cabello, C. Reyes, S. Tournier and Y. Gachet. MAARS: a novel high-content acquisition software for the analysis of mitotic defects in fission yeast. *Molecular Biology of the cell*, 28(12),1601-1611

2015 H. Mary*, **J. Fouchard***, G. Gay, C. Reyes, T. Gauthier, C. Gruget, J. Pécréaux, S. Tournier and Y. Gachet, **equal contribution.* Fission yeast kinesin-8 controls chromosome congression independently of oscillations. *Journal of Cell Science*, 128(20):3720–3730.

2015 J. Étienne, **J. Fouchard**, D. Mitrossilis, N. Bufi, P. Durand-Smet and A. Asnacios. Cells as liquid motors: Mechanosensitivity emerges from collective dynamics of actomyosin cortex. *PNAS*, 112(9):2740–2745.

2014 **J. Fouchard**, C. Bimbard, N. Bufi, P. Durand-Smet, A. Proag, A. Richert, O. Cardoso, and A. Asnacios. Three-dimensional cell body shape dictates the onset of traction force generation and growth of focal adhesions. *PNAS*, 111(36):13075–13080.

2010 D. Mitrossilis, **J. Fouchard**, D. Pereira, F. Postic, A. Richert, M. Saint-Jean, and A. Asnacios. Real-time single-cell response to stiffness. *PNAS*, 107(38):16518–16523.

2010 M.R. Buckley, A.J. Bergou, **J. Fouchard**, L.J. Bonassar, and I. Cohen. High-resolution spatial mapping of shear properties in cartilage. *Journal of biomechanics*, 43(4):796–800.

2009 D. Mitrossilis, **J. Fouchard**, A. Guiroy, N. Desprat, N. Rodriguez, B. Fabry, and A. Asnacios. Single-cell response to stiffness exhibits msucle-like behavior. *PNAS*, 106(43):18243–18248.

Reviews and comments

2022 A. Erlich, J. Étienne, J. Fouchard, and T. Wyatt. How dynamic prestress governs the shape of living systems, from the subcellular to tissue scale. *Interface Focus*, 12(6), 20220038.

2016 N. Khalilgharibi*, **J. Fouchard***, P. Recho*, G. Charras and A.Kabla **equal contribution.* The dynamic mechanical properties of cellularised aggregates. *Current Opinion in Cell Biology*, 42 (2016): 113-120.

2011 **J. Fouchard**, D. Mitrossilis, and A. Asnacios. Acto-myosin based response to stiffness and rigidity sensing. *Cell Adhesion and Migration*, 5(1):16–19.

2011 A. Asnacios, **J. Fouchard**, and D. Mitrossilis. Mécano-sensibilité cellulaire: adaptation physique à la rigidité. *Images de la physique*, 72–78.

International conferences & workshops oral presentations

2023 Active and passive mechanical response of soft fibrous micro-tissue to controlled deformation **(invited speaker)**, *Biomechanics Outsourcing New Disciplines*, Naples.

2019 Curling and buckling of epithelial monolayers **(invited speaker)**, *Cote d'Azur International Workshop on Cell Mechanics Advanced Tools and Applications to Biomedical Problems*, Nice.

2019 Curling of epithelial monolayers **(invited speaker)**, *The Mechanics of Cell Aggregates: Experiments and Models*, Turin.

2018 Active forces and mechano-adaptation in cell and tissue function **(invited speaker)**, *BIOTEC Symposium, Chair Biophysics of active matter*, Dresden.

2018 Basal constriction generates spontaneous curvature governing 3D substrate-free epithelial monolayer shape, *Physics of living matter XIII*, Marseille.

2017 The response of epithelial monolayers to large compressive stress: buckling and flattening reveal active and fluid-like behavior, *Multiscale problems in Biomechanics and Mechanobiology*, Vienna.

2011 Quantifying focal contacts dynamics and traction force during early cell spreading, *4th European Cell Mechanics Meeting*, Amsterdam.

National conference oral presentations (France)

2023 Cell-scale constraints on the kinetics of cell spreading , *Mechanics and Physics of biological surfaces day (GDR MePhy)*, Paris.

2023 L'essaimage du mot stroma dans les sciences biologiques et médicales au milieu du XIXe siècle, with N. Rousseau, *Congrès de la société française d'Histoire et Philosophie des Sciences et Techniques*, Bordeaux.

2017 Dissecting the developmental and biophysical aspects of epithelial tissue fracture **(invited speaker)**, *Workshop Biophysical Approaches of Living Systems*, Toulouse.

2017 Flow and fracture of cellular monolayers **(invited speaker)**, *Congrès de la Société Française de Physique*, Orsay.

2010 Focal contacts dynamics during early cell spreading, *GDR CellTiss*, Carry-le-Rouet.

Seminars

2021 LJP, Sorbonne University, invited by S. Grigolon

2020 ENS/ESPCI (Biophysics seminar), invited by N. Desprat

2019 IBPS, Université Pierre et Marie Curie, invited by D. Duprez

2019 MSC, Université Paris Diderot, invited by N. Chevalier

2016 LAI, University Aix-Marseille, invited by O. Théodoly

2014 LCN, University College London, invited by G. Charras

2014 Stanford university, invited by M. Goodman

2013 LiPhy, University Grenoble-Alpes, invited by J. Etienne

2013 IBDM, University Aix-Marseille, invited by P-F Lenne

2013 University of Geneva, invited by M. Milinkovitch

Awards & Grants

2022 Recipient of ITMO Cancer grant, Approches inter-disciplinaires des processus oncogéniques et perspectives thérapeutiques, Visco2Gamma project (60 k€)

2021 Co-recipient of DIM Elicit Région Ile-de-France grant, Technologies innovantes pour les sciences du vivant, Free2Morph project (200 k€)

2021 Research grant from Initiatives Humanités biomédicales - Sorbonne Université (7 k€), *Names and representations of biological tissues* (in col. with Nathalie Rousseau, MCF SU)

2019 Recipient of the London Center for Nanotechnology Award 2019, Researcher Staff category

2018 Recipient of EMBO Short-term fellowship

2014 Recipient of Fondecyt post-doctoral fellowship - CONYCIT Chilean Ministry of education programme (140 kUS$ secured funding including salary and research expenses) *declined*

2009 Recipient of PhD thesis bursary of the French Ministry of Research (3 years funded salary)

Outreach

Larger public Fête de la science 2021, 2022 & 2023 - Organisation of lab tours and demonstrations

Charity UCL *English & Science* Summer school for refugees and young migrants: organisation, teaching, design of practical courses (2019)

Art/science Experimental conferences with Jochen Dehn (artist) and KD N'Guyen Thu Lam (physicist). *School for invisibility*, at Cité des arts (2018), Biennale de Lyon (2011). *Folds, springs, solid cloud*, residency at Bétonsalon, Centre d'art et de recherche (2009)

Other academic activities

Students & staff supervision

2023- Olga Vasiljevic, PhD student, co-supervised with Léa-Laëtitia Pontani & Marie Breau, IBPS, Sorbonne Université

2021- Ali Wahood, PhD student, co-supervised with Jocelyn Etienne, LiPhy, Grenoble

2022-2023 Gowthamy Sivakuru, Research assistant, funded by ITMO Cancer grant

2021-now Supervision of 4 undergraduate students

Teaching

2021- **Sorbonne Université**, Mineure Histoire et Philosophie des Sciences et techniques
Supervision of research projects: UE Mémoire de recherche encadré, L3

2014 **Université Paul Sabatier - Toulouse 3**, Biology department (4h)
Cell mechanics course + students presentations of recent articles (2^{nd} year Master Genes, cells, development, 15 students)

2009-2011 **Université Paris Diderot**, Physics department (64h).
- Fundamentals of optics : tutorials, end-of-year exams (1^{st} year Physics undergraduate, 30 students)
- Image analysis : hands-on computing practicals (3^{rd} year BA Biophotonics, 15 students)
- Differential equations : tutorials (1^{st} year Biology undergraduate, groups of 2 students)

2007-2008 **Université Paris Diderot**, Physics department (1h30/week).
Mechanics, mathematics : Tutorials catch-up sessions (1st year Physics & Mathematics undergraduate)

Administration and community

2023- PhD jury member in 1 thesis defense : Adam Ouzeri (Universitat Polytecnica de Catalunya, defended in June 2023).

2023- Scientific expert in 2 thesis commitees : Quention Chaboche (Physico-chimie Curie, 2022-); Cécile Vincent (Laboratoire Jean Perrin, 2022-).

2022- In charge of carbon footprint quantification at the Laboratoire de Biologie du Développement, in collaboration with IBPS Green commitee.

2017-2019 Founder and organizer of evening gatherings 'Pint of Science' - Discussions about scientific practice and interdisciplinarity
(sponsored by Institute for Physics of Living Systems, University College London)

2010-2012 Representative of non-permanent staff at the institute board during PhD (Matière et Systèmes Complexes, CNRS/Université Paris Diderot)

Reviewing

Reviewer for ANR; reviewer for the *Programme Emergences* (scheme of the city of Paris for young principal investigators); reviewer for *Nature Communications*, *Scientific Reports*.