

27–29 August 2018

SOLVAY WORKSHOP

Mechanics of slender structures in physics, biology and engineering: From failure to functionality

Université libre de Bruxelles, Campus de la Plaine, Brussels Building N.O. – 5th Floor – SOLVAY ROOM

MONDAY 27 AUGUST

08.30–09.00 Registration and coffee

09.00–09.20 Welcome by Marc Henneaux (Director of the Solvay Institutes, Brussels) and introduction

Session 1 Elastic Instabilities of Slender Objects (Chairperson: Pedro M. Reis)

09.20–10.10 **Alain Goriely** – Curves, strings, rods, filaments, and strips: elasticity, morphoelasticity, and configurational elasticity.10.10–10.30 **Tobias M. Schneider** – From turbulence transition to the buckling of a soda can10.30–10.50 **David M. J. Dykstra** – Tensile instability in a thick elastic body

10.50–11.10 COFFEE BREAK

11.10–12.00 **Benny Davidovitch** – Geometrically incompatible confinement and generalized tension field theory: from Euler *elastica* to Gauss-Euler *elastica*12.00–12.20 **Derek E. Moulton** – Stable elastic knots with no self-contact

12.20–13.20 LUNCH

13.20–14.10 **Vincent Démery** – Geometric models for thin sheets at liquid interfaces14.10–14.30 **Douglas P. Holmes** – Elastogranular mechanics in fragile matter14.30–14.50 **Yousra Timounay** – Wrinkle-to-crumple transition in thin films on curved surfaces

14.50–15.10 COFFEE BREAK

Session 2A Elasto-Capillarity/Fluid-Structure Interaction (Chairperson: Denis Terwagne)

15.10–16.00 **Pierre-Thomas Brun** – Building with fluids, lazy design of functional materials16.00–16.50 **Thomas Salez** – Elastohydrodynamics of an immersed particle near a soft wall16.50–17.10 **Andrej Kosmrlj** – Capillarity-induced folding of wrinkled skin17.10–17.30 **Julien Chopin** – Dynamic wrinkling and strengthening of a filament in a viscous fluid

18.00–20.00 POSTER SESSION

TUESDAY 28 AUGUST

Session 2B Elasto-Capillarity/Fluid-Structure Interaction (Chairperson: Fabian Brau)

09.00–09.50 **Dominic Vella** – Liquid drops on slender structures: From partial wetting to insect adhesion

09.50–10.40 **Draga Pihler-Puzovic** – Instabilities in blistering

10.40–11.00 COFFEE BREAK

Session 3 Foldable Structures/Origamis/Kirigamis (Chairperson: Andrej Kosmrlj)

11.00–11.50 **Itai Cohen** – Atomic origami: a technology platform for nanoscale machines, sensors, and robots

11.50–12.10 *Agustin Iniguez-Rabago* – Finding the mechanical stable states of prismatic architected materials

12.10–12.20 GROUP PHOTO

12.20–13.20 LUNCH

13.20–14.10 **José Bico** – From 2D plates to 3D structures: playing with Carl Gauss

14.10–15.00 **Julian Lienhard** – Naturally integral

15.00–15.20 COFFEE BREAK

Session 4A Biomechanics (Chairperson: Derek E. Moulton)

15.20–16.10 **Ellen Kuhl** – Instabilities in Soft Structures

16.10–17.00 **Sébastien Neukirch/Paul Grandgeorge** – Drops on fibers and liquid films on membranes

17.00–17.20 *Tristan Gilet* – The elastocapillary adhesion of a wet beam: A model for the terrestrial locomotion of insects

17.20–17.40 *Amandine Lechandre* – Capture of viscous fluids in living organisms

19.30 CONFERENCE DINNER – Le Belga Queen - Rue Fossé aux Loups, 1000 Brussels

WEDNESDAY 29 AUGUST

Session 4B Biomechanics (Chairperson: Douglas P. Holmes)

- 09.00–09.50 **Thomas Speck** – Plant stems and ramifications: fibre-reinforced slender structures with mechanically highly efficient outer form and inner hierarchical structuring
- 09.50–10.10 *Martin Brandenbourger* – Nonlinear flow response of a channel with asymmetric valves inspired from the lymphatic system
- 10.10–10.30 *Nicolas Vandewalle* – Exploiting magnetocapillary interactions for swimming along liquid interfaces
- 10.30–10.50 COFFEE BREAK

Session 5 Bio-Inspired Robotics/Stretchable Electronics (Chairperson: Julien Chopin)

- 10.50–11.40 **Stéphanie Lacour** – Engineering elasticity in thin films
- 11.40–12.00 *Giorgio Oliveri* – Reprogramming the elastic properties of mechanical metamaterials by amplifying imperfections
- 12.00–13.00 LUNCH
- 13.00–13.50 **Fumiya Iida** – Embodied intelligence in soft deforming structures of robots
- 13.50–14.40 **Bram Vanderborght** – Self-healing soft robots
- 14.40–15.00 *Poincloux Samuel* – Plastic fluctuations in a knitted fabric

Session 6 Soft-Matter, Structures and Art (Chairperson: Pascal Damman)

- 15.00–15.50 **Dominique Peysson** – In formation & information in living materials
- 15.50–17.00 FAREWELL COFFEE