Thomas G. J. Chandler

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Profile

I am a Van Vleck Visiting Assistant Professor researching applied mathematics at the University of Wisconsin–Madison. My research focuses on solving physically inspired problems using applied mathematical techniques, particularly asymptotic, numerical, and complex analyses. I am especially interested in applications within fluid dynamics, solid mechanics, and mathematical biology.

Academic Positions

2021–2024 **Van Vleck Visiting Assistant Professor — Department of Mathematics, University of Wisconsin–Madison, WI, USA**

Postdoctoral research position in the Department of Mathematics, specializing in liquid crystals interacting with soft matter, advised by Prof. Saverio Spagnolie[†].

TEACHING: *Math 421 (Spring 2023), Math 415 (Fall 2023), Math 322 (Spring 2022), Math 320! (Spring 2024, Fall 2023, Fall 2021).*

Education

2017–2021 **DPhil Mathematics — Mathematical Institute, University of Oxford, UK**

Doctor of Philosophy degree specializing in the mechanics of thin elastic materials and the interaction with soft matter, supervised by Prof. Dominic Vella[‡] (OCIAM).

THESIS: *'Mathematical Models of Two-Dimensional Sheets and Foundations'*
BROADENING COURSES: *Statistical Mechanics, Soft Matter, Scientific Computing for DPhil Students I & II, and Theories of Deep Learning.*

2013–2017 **MMath Mathematics — Lincoln College, University of Oxford, UK**

Fourth Year (MMath) — First-Class Honours (85.3%)

DISSERTATION: *'Complex singularities near the intersection of a free-surface and a rigid wall'* supervised by Dr Philippe Trinh[§] (90%, Gibbs Dissertation Prize).
COURSES: *Applied Complex Variables, Perturbation Methods, Solid Mechanics, Mathematical Geoscience, Elasticity & Plasticity, and Topics in Fluid Mechanics.*

Third Year (BA) — First-Class Honours (82%)

EXTENDED ESSAY: *'Jets, waterfalls and splashes from angled slots'* supervised by Dr Philippe Trinh[§] (82%).

2008–2013 **Freman College, Buntingford, Hertfordshire, UK**

A-Level (2013): Mathematics (A*), Further Mathematics (A*), Physics (A).
AS-Level (2012): Chemistry (A), STEP I & II.

Academic Accolades

2023 **Honored Instructor — University Housing, UW–Madison**
A student-initiated program which recognizes outstanding classroom instructors.

2020 **DSOFT Student Travel Award — APS March Meeting 2020**
An APS Division of Soft Matter travel grant, awarded for a high quality of work.

2019 **Teaching Award — Mathematical Institute, University of Oxford**
Awarded in recognition of outstanding feedback received from students.

2017–2021 **EPSRC Doctoral Grant — Mathematical Institute, University of Oxford**
A fully funded Doctoral Training Grant for a three-and-a-half-year period.

[†]Department of Mathematics, University of Wisconsin–Madison. [‡]Mathematical Institute, University of Oxford.
[§]Department of Mathematical Sciences, University of Bath.

2017 **Gibbs Dissertation Prize — Mathematical Institute, University of Oxford**
Awarded for the best 4th year MMath dissertation (achieved grade: 90%).

2017 **Stansbie Prize — Lincoln College, University of Oxford**
Awarded for the best performance across all science final honours schools.

2016–2017 **Lord Crewe Scholarship — Lincoln College, University of Oxford**
Awarded on tutors' and advisers' recommendations for outstanding work.

2015–2016 **College Scholarship — Lincoln College, University of Oxford**
Awarded for academic achievement and exceptional promise.

2013–2016 **Collection Prize — Lincoln College, University of Oxford**
Awarded on eight occasions for performance in college examinations.

Publications

2023 **Chandler, T. G. J.** & Spagnolie, S. E., 2023. Exact and approximate solutions for elastic interactions in a nematic liquid crystal. *Submitted.* arXiv:2311.17708.

2023 **Chandler, T. G. J.** & Spagnolie, S. E., 2023. A nematic liquid crystal with an immersed body: equilibrium, stress, and paradox. *J. Fluid Mech. 967*, A19. doi:10.1017/jfm.2023.488. arXiv:2301.10924.

2021 **Chandler, T. G. J.**, 2021. Mathematical models of two-dimensional sheets and foundations. [PhD thesis]. University of Oxford. ora.ox.ac.uk/objects/uuid:b2368224-dc2d-4240-8b21-db5c9e370198.

2020 **Chandler, T. G. J.** & Vella, D., 2020. Validity of Winkler's mattress model for thin elastomeric layers: Beyond Poisson's ratio. *Proc. R. Soc. A. 476*, 20200551. doi:10.1098/rspa.2020.055. arXiv:2010.11133.

2020 **Chandler, T. G. J.** & Vella, D., 2020. Indentation of suspended two-dimensional solids: The signatures of geometrical and material nonlinearity. *J. Mech. Phys. Solids. 144*, 104109. doi:10.1016/j.jmps.2020.104109. arXiv:2002.05634.

2018 **Chandler, T. G. J.** & Trinh, P. H., 2018. Complex singularities near the intersection of a free surface and wall. Part 1. Vertical jets and rising bubbles. *J. Fluid Mech. 856*, 323–350. doi:10.1017/jfm.2018.708.

In prep. **Chandler, T. G. J.**, Boudaoud, A., Shorthose, O., Maiolino, P. & Vella, D., 20–. Morpho-mechanics of pressurized cellular sheets. *In preparation.*

In prep. Han, M., Mao, H., **Chandler, T. G. J.** & Spagnolie, S. E., 20–. Geometric dependence of curvature-induced rigidity. *In preparation.*

Presentations

Mar. 2024 **American Physical Society, March Meeting — Minneapolis, MN**
Oral presentation: *'Interactions in nematic liquid crystals: from activity to deformability.'*

Jan. 2024 **SIAM Student Chapter Seminar — UW–Madison, WI**
Oral presentation: *'From classic fluid dynamics to nematic liquid crystals.'*

Dec. 2023 **Mechanics of Life II Meeting, CCB — Flatiron Institute, NY**
Oral presentation: *'Exact and approximate solutions for elastic interactions in anisotropic fluids.'*

Nov. 2023 **American Physical Society, Division of Fluid Dynamics — Washington, DC**
Oral presentation: *'Fluid–body interactions in passive and active liquid crystals.'*

Jun. 2023 **Gordon Research Conference, Liquid Crystals — SNHU, NH**
Poster presentation: *'A nematic liquid crystal with immersed bodies: equilibrium, stress, and paradox.'*

Mar. 2023 **American Physical Society, March Meeting — Las Vegas, NV**
Oral presentation: *'Fluid–structure interactions in nematic liquid crystals: A complex variable approach.'*

Jan. 2023 **Soft Matter Seminar Series — UW–Madison, WI**
Oral presentation: *'Fluid–body interactions in nematic liquid crystals: A complex variable approach.'*

Oct. 2022 **Guest Presenter at Rycroft's Group Meeting — UW–Madison, WI**
Oral presentation: *'Deformation of thin elastomeric substrates: From elastohydrodynamic sedimentation to Hele-Shaw flow.'*

Oct. 2022 **Society of Rheology, Annual Meeting — Chicago, IL**
Oral presentation: *'Fluid–structure interactions in nematic liquid crystals.'*

Sep. 2022 **Applied and Computational Mathematics Seminar — UW–Madison, WI**
Oral presentation: *'Fluid–body interactions in nematic liquid crystals: A complex variable approach.'*

Mar. 2022 **American Physical Society, March Meeting — Chicago, IL**
Oral presentation: *'Morpho-mechanics of pressurized cellular sheets: From moss leaves to soft robotics.'*

Nov. 2021 **American Physical Society, Division of Fluid Dynamics — Phoenix, AZ**
Oral presentation: *'The interaction of thin elastomeric substrates with viscous flows: From elastohydrodynamic sedimentation to Hele-Shaw flow.'*

Mar. 2020 **American Physical Society, March Meeting — Denver, CO**
Oral presentation: *'The interaction of elastomeric coatings with viscous flows: How incompressible is PDMS?'* (Performed virtually due to COVID-19.)

Apr. 2019 **British Applied Mathematics Colloquium — University of Bath, UK**
Oral presentation: *'Indentation tests of two-dimensional materials: separating nonlinear material behaviour from experimental error.'*

May. 2018 **Junior Applied Mathematics Seminar — University of Oxford, UK**
Oral presentation: *'Complex singularities near the intersection of a free-surface and a rigid wall.'*

Apr. 2016 **British Applied Mathematics Colloquium — University of Oxford, UK**
Poster presentation: *'Jet flows from angled nozzles.'*

Teaching Experience

2021, 2023, & 2024 **Math 320(!) Instructor — Department of Mathematics, UW–Madison**
Honors course introducing differential equations and linear algebra.

2023 **Math 415 Instructor — Department of Mathematics, UW–Madison**
An introductory course to nonlinear dynamical systems, chaos, and modelling.

2023 **Math 421 Instructor — Department of Mathematics, UW–Madison**
A proof-based course on the theory of single variable calculus.

2022 **Math 322 Instructor — Department of Mathematics, UW–Madison**
A first course on partial differential equations and applied mathematics techniques.

2019, 2020 **Elasticity and Plasticity Class Tutor — Mathematical Institute, Oxford**
MMath Part C course covering introductory problems in linear elasticity.

2020 **Topics in Fluid Mechanics Class Tutor — Mathematical Institute, Oxford**
MMath Part C course covering current fluid problems in industry and geoscience.

2018 **Solid Mechanics Class T.A. — Mathematical Institute, Oxford**
MMath Part C course covering an introduction to nonlinear solid mechanics.

2018 **Elasticity and Plasticity Class T.A. — Mathematical Institute, Oxford**
MMath Part C course covering introductory problems in linear elasticity.

2017–2019 **Topics in Fluid Mechanics Class T.A. — Mathematical Institute, Oxford**
MMath Part C course covering current fluid problems in industry and geoscience.

2013–2015 **Schools Plus Mathematics Tutor — The Oxford Academy, Oxford**
Voluntary A-level and GCSE maths tutor with the Schools Plus program.

Other Experience and Skills

2017–2019	**Undergraduate Admissions Interviewer — Lincoln College, Oxford** During my DPhil, I interviewed potential Mathematics Undergraduates for Lincoln College, University of Oxford.
Jul.–Sept. 2016	**Summer Project — Mathematical Institute, University of Oxford** Funded by InFoMM, University of Oxford I worked with Dr Philippe Trinh[§] to further my third year project on the singularity structure of 'Jet Flows from Angled Nozzles'.
2014–2015, 2017–2018	**Treasurer of Oxford University Judo Club** Along with being a keen participating member, I was twice elected treasurer of OUJC.

Proficient in: Mathematica, MATLAB, LaTeX, Python, HTML, Microsoft Office, and Adobe Suite.