Thomas G. J. Chandler

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Profile

I am an Assistant Professor in the Department of Mathematics at the University of North Carolina at Chapel Hill. My research focuses on solving physically motivated problems using applied mathematics techniques, particularly asymptotic, numerical, and complex analysis. I am especially interested in applications to fluid dynamics, solid mechanics, and mathematical biology.

Academic Positions

2025– **Assistant Professor — Department of Mathematics, University of North Carolina at Chapel Hill, NC, USA**
A tenure-track faculty position in the Applied and Computational Mathematics group at UNC–Chapel Hill, focused on teaching and research.

2024–2025 **Research Associate with Prof. Spagnolie — Department of Mathematics, University of Wisconsin–Madison, WI, USA**
Postdoctoral research position with Prof. Saverio Spagnolie[†], specializing in active anisotropic fluids interacting with deformable structures.

2021–2024 **Van Vleck Visiting Assistant Professor — Department of Mathematics, University of Wisconsin–Madison, WI, USA**
A research and teaching position, specializing in fluid and solid mechanics within the context of mathematical biology, advised by Prof. Saverio Spagnolie[†].

Education

2017–2021 **DPhil Mathematics — Mathematical Institute, University of Oxford, UK**
Doctor of Philosophy degree on the mechanics of thin elastic materials and their interaction with fluids and soft structures, under the supervision of Prof. Dominic Vella[‡].
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%).

Academic Accolades

2024 **Postdoctoral Excellence in Mentoring and Outreach Award — Department of Mathematics, UW–Madison**
Awarded to outstanding postdocs for their contributions to mentoring and outreach.

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

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

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.

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

2025 **Chandler, T. G. J.** & Spagnolie, S. E., 2025. Active nematic response to a deformable body or boundary: surface deformations and anchoring-induced flow. *Phys. Rev. Res. 7*, 023263. doi:10.1103/x8y2-tw4c. arXiv:2409.15617.

2025 Mao, H., **Chandler, T. G. J.**, Han, M., & Spagnolie, S. E., 2025. Geometric dependence of curvature-induced rigidity. *Extreme Mech. Lett. 77*, 102341. doi:10.1016/j.eml.2025.102341. arXiv:2411.10382.

2025 **Chandler, T. G. J.**, Ferria, J., Shorthose, O., Allain, J.-M., Maiolino, P., Boudaoud, A., & Vella, D., 2025. Mechanics of pressurized cellular sheets. *J. R. Soc. Interface 22*, 20240653. doi:10.1098/rsif.2024.0653. arXiv:2409.12863.

2024 **Chandler, T. G. J.** & Spagnolie, S. E., 2024. Rigid and deformable bodies in nematic liquid crystals. *Phys. Rev. Fluids. 9*, 110511. doi:10.1103/PhysRevFluids.9.110511

2024 **Chandler, T. G. J.** & Spagnolie, S. E., 2024. Exact and approximate solutions for elastic interactions in a nematic liquid crystal. *SIAM J. Appl. Math 84*, 2476–2501. doi:10.1137/23M1622908. 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. 865*, 323–350. doi:10.1017/jfm.2018.708.

2017 **Chandler, T. G. J.**, 2017. *Complex singularities near the intersection of a free-surface and a rigid wall.* [Master's thesis]. University of Oxford.

Presentations

Jan. 2025 **Applied and Computational Mathematics Seminar — UW–Madison, WI**
Invited presentation: *'Fluid–structure interactions in active complex fluids.'*

Nov. 2024 **American Physical Society, DFD — Salt Lake City, UT**
Oral and Poster presentation (DFD-Interact): *'Deformable bodies in active nematics'*

Jun. 2024 **Guest Presenter at DAMTP Biolunch Seminar — Cambridge, UK**
Invited presentation: *'Deformable bodies in anisotropic fluids: from activity to elasticity.'*

Jun. 2024 **Fluid and Elasticity Conference — Arcachon, France**
Oral and Poster presentation: *'Fluid–body interactions in elastic anisotropic fluids.'*

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**
Invited presentation: *'Fluid–body interactions in anisotropic fluids.'*

Dec. 2023 **Mechanics of Life II Meeting, CCB — Flatiron Institute, NY**
Invited 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**
Invited presentation: *'Fluid–body interactions in nematic liquid crystals: A complex variable approach.'*

Oct. 2022 **Guest Presenter at Rycroft's Group Meeting — UW–Madison, WI**
Invited 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**
Invited 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**
Invited 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.'*

Mentoring Experience

2022–25 **Mentored Hanzhang Mao (PhD student) and Mark Han (undergraduate)**
Co-mentored two students on a project investigating the geometric dependence of curvature-induced rigidity with Prof. Saverio Spagnolie.

Publication: Mao, H., Chandler, T. G. J., Han, M., & Spagnolie, S. E., 2025. Geometric dependence of curvature-induced rigidity. *Extreme Mech. Lett.* 77, 102341.

Oral Presentation, Mar. 2024: *'Geometric dependence of curvature-induced rigidity.'* H. Mao, M. Han, T. G. J. Chandler, S. E. Spagnolie. American Physical Society March Meeting — Minneapolis, MN.

Poster Presentation, Dec. 2023: *'Geometric dependence of curvature-induced rigidity in thin elastic sheets.'* H. Mao, M. Han, T. G. J. Chandler, S. E. Spagnolie 2023. Mechanics of Life II Meeting — Flatiron Institute, NY.

2022–23 **Mentored Jiarui Huang (Master of Science student)**
Co-mentored a student on a project investigating the dynamics of rigid bodies immersed in nematic liquid crystals with Prof. Saverio Spagnolie.

Teaching Experience

Fa. 2025 **Math 383 Instructor — Department of Mathematics, UNC–Chapel Hill**
A first course in differential equations and their applications.

Sp. 2024, Fa. 2023 & 21 **Math 320(!) Instructor — Department of Mathematics, UW–Madison**
Honors course introducing differential equations and linear algebra.

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

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

Sp. 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 mathematics tutor with the Schools Plus program.

Other Experience, Outreach, Service, and Skills

2018– **Academic Journal Peer Reviewer**
I have refereed for the following academic journals: *Journal of Fluid Mechanics*, *Journal of Engineering Mathematics*, *Nature Communications*, *Proceedings of the Royal Society A*, *Physical Review Fluids*, *Physical Review Letters*, *Physical Review X*, *Soft Matter*.

2018–2019 **Oxford Mathematics Festival Coordinator**
I helped run an Applied Mathematics stall at the Oxford Mathematics Festival in 2018 and 2019. The goal of the event was to create intrigue and excitement for the subject, while raising public awareness of science.

2017–2020 **Open Day Volunteer — Mathematical Institute, University of Oxford**
During my DPhil, I helped run Postgraduate and Undergraduate Open Days within the Mathematical Institute, University of Oxford.

2017–2019 **Undergraduate Admissions Interviewer — Lincoln College, Oxford**
I interviewed prospective mathematics undergraduates applying to Lincoln College at the University of Oxford for the 2017–18 and 2018–19 admission cycles.

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.