

CONTACT INFORMATION	<p>Mechanical Engineering The University of Sheffield Mappin Street Sheffield, UK, S1 3JD</p>	<p>Cell: 07518027295 E-mail: arturgower@gmail.com Website: arturgower.github.io</p>
RESEARCH INTERESTS	Wave propagation, random media, solid mechanics, and supervised machine learning.	
PROGRAMMING	Julia, Mathematica, C, C++, Matlab, Bash, and T _E X (L ^A T _E X, B ^B T _E X, TikZ).	
ACADEMIC HISTORY	<p>The University of Sheffield, UK Lecturer in Dynamics, Mechanical Engineering 01/2019 – present</p> <p>University of Manchester, UK Research associate, Applied Mathematics 10/2015 – 12/2018</p> <ul style="list-style-type: none"> • <i>Ultrasonic propagation in complex media</i> - EPSRC (EP/M026205/1) • Responsible for mathematical modelling and numerical implementation. Strong ties with experiments (EP/M026310/1) and simulations (EP/M026302/1) <p>NUI Galway, Ireland Ph.D. Applied Mathematics 09/2011 – 09/2015</p> <ul style="list-style-type: none"> • Thesis title: <i>Incremental elastic surface waves and static wrinkles</i> • Supervisor: Prof. Michel Destrade <p>University of Campinas, Brazil (QS 2nd best university in Latin America) M.Sc. Applied Mathematics, Grade 96% 03/2009 – 05/2011</p> <p>Computational geophysics group</p> <ul style="list-style-type: none"> • Thesis: <i>Nonlinear Elasticity with Radial Symmetry</i> • Emphasis in wave scattering and propagation in Geophysics. <p>B.Sc. Applied Mathematics, Grade 83% 03/2005 – 12/2008</p> <ul style="list-style-type: none"> • Emphasis on Mechanics with a minor in Computer Science 	
TEACHING EXPERIENCE	<p>Qualification Teaching and learning course - (5 ECTS) NUI Galway 2013</p> <p>University of Manchester <i>Supervision</i></p> <ul style="list-style-type: none"> • Informal Ph.D supervisor, Erik Garcia Neefjes, working on thermo-visco-elastic waves. Erik is on track to complete his PhD on time. 09/2017 – present • Final year undergraduate on <i>Acoustic Scattering from Cylinders</i>. Janni Harju compared multiple scattering theory with numerical software. 2018 • Summer intern <i>Modelling the Bladder using Non-Linear Elasticity</i>. Imagining the bladder as a rubber material, Farid Breffni Hounat found the optimal material to sustain varied internal fluid pressure. 2017 • Summer intern <i>Using elastic waves to measure initial stress</i>. Sara Ilhac related bulk wave speeds with directions of tension. 2016 <p><i>Tutorials</i> 09/2015 – 06/2018</p> <ul style="list-style-type: none"> • Led problem solving classes on calculus, linear algebra, complex analysis for B.Sc. mathematics and B.Sc. engineering 1st to 2nd year students. • Marked and provided constructive feedback on weekly assignments. 	

NUI Galway

Tutorials and lectures

09/2014 – 06/2015

- Taught tutorials, and occasional lectures, on Fluid Mechanics and Nonlinear Elasticity to final year B.Sc. mathematics students.
- Marked and provided constructive feedback on weekly assignments.

Tutorials

09/2011 – 06/2014

- Led problem solving classes on vector calculus, mathematical modelling, linear algebra, mathematical methods for B.Sc. mathematics and engineering.
- Marked exams and gave in class feedback.

Drop-in centre

03/2012 – 11/2014

- Taught at the centre for the [Support for Undergraduate Mathematics](#).

University of Campinas

Lectures

02/2010 – 07/2010

- Lectured on Linear Algebra to B.Sc. engineering 1st year students.
- Prepared lectures, wrote and graded exams.

Pas Facamp (Charity)

07/2009 – 09/2009

- Taught basic finance to the local community.

FUNDING

EPSRC, Postdoctoral Fellowship (unsuccessful, rank 7/35)

2018

Title: Predicting the properties of particulate materials from backscattered waves

Principal Investigator: Artur L. Gower

Funding Value: N/A

[Irish Research Council](#), PhD fellowship

09/2013 - 09/2015

Title: Nonlinear modelling of soft matter

Principal Investigators: Artur L. Gower and Michel Destrade

Funding Value: €46k

[Hardiman Scholarship](#), PhD fellowship

09/2011 - 09/2013

Title: Skin deep: the mechanics of skin

Principal Investigators: Artur L. Gower and Michel Destrade

Funding Value: €42k

[Brazilian National Council for Scientific and Technological Development](#),

M.Sc. fellowship (rank 1/45)

02/2009 - 03/2011

Title: Nonlinear elastodynamics with radial symmetry

Principal Investigator: Artur L. Gower

Funding Value: R\$29k (≈ 5.5 k)

[Sao Paulo Research Foundation](#) Undergraduate Research Scholarship

Title: Acoustic diffraction with Kirchhoff modelling

03/2007 - 02/2008

Principal Investigator: Artur L. Gower and Lucio T. Santos

Funding Value: R\$6k (≈ 1.1 k)

Title: Introduction to discrete chaotic dynamics

03/2006 - 02/2007

Principal Investigator: Artur L. Gower and Lucio T. Santos

Funding Value: R\$6k (≈ 1.1 k)

RECENT SOFTWARE

[S3] A.L. Gower and J. Deakin. A Julia library for simulating, processing, and plotting multiple scattering of waves. [MultipleScattering.jl](#), GitHub, MIT License.

[S2] A.L. Gower. A Julia library to calculate the effective wave reflection and transmission in material random materials. [EffectiveWaves.jl](#), GitHub, MIT License.

[S1] A.L. Gower. A Mathematica package that uses the concept of entropy maximisation to calculate the influence on a GO board. [EntropyGO](#), GitHub, MIT License.

SUBMITTED

- [15] A.L. Gower, W.J. Parnell, I.D. Abrahams, “Multiple Waves Propagate in Random Particulate Materials”, *arXiv* 1810.10816, (2018)
- [14] V.J. Pinfield, D.M. Forrester, A.L. Gower, W.J. Parnell, I.D. Abrahams, “Thermoviscoacoustic scattering by a spherical particle: comparison of analytical and finite element models”, *submitted*, (2018)

 REFEREED
 JOURNAL
 PAPERS

Total citations: 169, according to my **Google Scholar**.

- [13] A.L. Gower, R.M. Gower, J. Deakin, W.J. Parnell, I.D. Abrahams, “Characterising particulate random media from near-surface backscattering: A machine learning approach to predict particle size and concentration”, *Europhysics Letters*, (2018) 122 (5)
- [12] A.L. Gower, M.J.A. Smith, W.J. Parnell, I.D. Abrahams, “Reflection from a multi-species material and its transmitted effective wavenumber”, *Proceedings of the Royal Society A*, (2018)
- [11] A. Agosti, A.L. Gower, P. Ciarletta, “The constitutive relations of initially stressed incompressible Mooney-Rivlin materials”, *Mechanics Research Communications*, (2017)
- [10] A.L. Gower, T. Shearer, P. Ciarletta, “A new restriction for initially stressed elastic solids”, *Quarterly Journal of Mechanics and Applied Mathematics*, 70(2017)
- [9] M. Carfagna, M. Destrade, A.L. Gower, A. Grillo, “Oblique wrinkles”, *Philosophical Transactions of the Royal Society A*, Invited contribution to the themed issue on *Patterning through instabilities in complex media*, 375(2017)
- [8] P. Ciarletta, M. Destrade, A.L. Gower, M. Taffetani, “Morphology of residually stressed tubular tissues: beyond the elastic multiplicative decomposition”, *Journal of the Mechanics and Physics of Solids*, 90 (2016)
- [7] P. Ciarletta, M. Destrade, A.L. Gower, “On residual stresses and homeostasis: an elastic theory of functional adaptation in living matter”, *Scientific Reports*, 6 (2016)
- [6] R.M. Gower, A.L. Gower, “High order reverse automatic differentiation with emphasis on the third order”, *Mathematical Programming SERIES A*, 155 (2016)
- [5] A.L. Gower, P. Ciarletta, M. Destrade, “Initial stress symmetry and its application in elasticity”, *Proceedings of the Royal Society A*, 471 (2015)
- [4] A.L. Gower, “Connecting the material parameters of soft fibre-reinforced solids with the formation of surface wrinkles”, *Journal of Engineering Mathematics*, Special Issue on Fibre-Reinforced Materials, 95 (2015)
- [3] D.R. Nolan, A.L. Gower, M. Destrade, R.W. Ogden, J.P. McGarry, “A robust anisotropic hyperelastic formulation for the modelling of soft tissue”, *Journal of the Mechanical Behavior of Biomedical Materials*, 39 (2014)
- [2] A.L. Gower, M. Destrade, R.W. Ogden, “Counter-intuitive results in acousto-elasticity”, *Wave Motion*, Special Issue in Honour of V.I. Alshits, 50 (2013)
- [1] P. Ciarletta, M. Destrade, A.L. Gower, “Shear instability in skin tissue”, *Quarterly Journal of Mechanics and Applied Mathematics*, 66 (2013)

 TECHNICAL
 REPORTS

- [6a] A.L. Gower, Chapter: “Generating feasible solutions: part 1”, In: Automatic Optimised Design of Umbilicals (ESGI 100), *MIIS Eprints Archive*, 710 (2016)
- [3a] A.L. Gower, Chapter: “Elimination of errors from track line detection”, In: Train Positioning Using Video Odometry (ESGI 116), *MIIS Eprints Archive*, 672 (2014)
- [1b] A.L. Gower, C. Brett, J. Herterich, K. Katterbauer, A. Melnik, J. Thompson, “Modelling of abrasive waterjet etching” (OCCAM 4th Modelling Camp), (2012)

- [1a] A.L. Gower, “Detecting Geometric Faults from Measured Data” (ESGI 85), *MIIS Eprints Archive*, 659 (2012)

ACADEMIC SERVICES

Reviewer:

Proceedings of the Royal Society A | *International Journal of Non-Linear Mechanics* | *IMA Journal of Applied Mathematics* | *SIAM Journal of Applied Mathematics* | *ZAMP* (Journal of Applied Mathematics and Physics) | *Journal of the Acoustical Society of America* | *Acta Acustica United with Acustica*

OUTREACH

- **The New Scientist Live.** A science festival that attracts over 30,000 visitors. I demonstrated acoustic levitation and other phenomena over a weekend. **09/2018**
- **Science Showdown! *How can we measure the invisible: the mathematics of jiggly waves.*** A talk promoting maths to a wider audience in Manchester. **03/2017**
- **Science Experience Workshop:** on open days we gave potential students a hands on science experience. I ran a stand on maths/physics puzzles. **2011 - 2014**
- **Maths Enrichment:** Teach two morning sessions preparing students for the Irish and international mathematics Olympiad. **2014**
- **School Presentation for the School of Science:** Two school visits to engage with students about studying science at university. **2011**

EVENTS

CO-ORGANIZED

- **Acoustics Early Career Summer School** **6–9/08/2018**
A workshop to train early career acousticians in career development, public speaking, writing for the general public and industry collaboration
- **Constitutive Behaviour of Soft Tissues** **31/08–2/09 2016**
A workshop to establish the state-of-the-art in constitutive behaviour of soft tissue
- **Joint Symposium: Irish Mechanics Society and Irish Society for Scientific Engineering & Computation (ISSEC)** **8–9/11/2014**
An annual international mechanics conferences
- **Irish Applied Maths Research Students’ Meeting** **11/10/2014**
Organized by the SIAM student chapter, this was the first meeting of postgraduates working in applied mathematics across Ireland.
- **Stokes Modelling Workshop** **23–26/06/2014**
A modelling workshop to solve problems brought by industry, in the same style as the European Study Groups with Industry.

RECENT TALKS

- I have given over 20 academic talks in workshops and international conferences.
- **I. David Abrahams 30th workshop,** “Waves in random particulate materials”, Isaac Newton Institute for Mathematical Sciences (INI), Cambridge, UK **09/2018**
 - **Research seminar,** “Using machine learning to characterise complex materials”, Malvern Panalytical Ltd, Malvern, UK **08/2018**
 - **Bremen Workshop on Light Scattering 2018,** “Characterising particulate random media from near-surface backscattering, Bremem, Germany **03/2018**
 - **Meeting of the Acoustical Society of America, 141 (5), 3810–3810,** “Characterizing composites with acoustic backscattering: Combining data driven and analytical methods”, Boston, USA **06/2017**
 - **New mathematics for a safer world: wave propagation in heterogeneous materials,** “Characterising random composites with acoustic backscattering”, International Centre for Mathematical Sciences (ICMS), Edinburgh, UK **06/2017**
 - **Constitutive behaviour of soft tissues,** “Constitutive modelling of initially stressed elastic solids”, Manchester, UK **09/2016**