

CONTACT INFORMATION	<p><b>Mechanical Engineering</b>  The University of Sheffield  Mappin Street  Sheffield, UK, S1 3JD</p>	<p><i>Cell:</i> 07518027295  <i>E-mail:</i> <a href="mailto:arturgower@gmail.com">arturgower@gmail.com</a>  <i>Website:</i> <a href="https://arturgower.github.io">arturgower.github.io</a></p>
RESEARCH INTERESTS	Wave propagation, random media, solid mechanics, and supervised machine learning.	
PROGRAMMING	Julia, Mathematica, C, C++, Matlab, Bash, and T <sub>E</sub> X (L <sup>A</sup> T <sub>E</sub> X, B <sub>I</sub> B <sub>T</sub> E <sub>X</sub> , TikZ).	
ACADEMIC HISTORY	<p><b>The University of Sheffield, UK</b>  Lecturer in Dynamics, <b>Mechanical Engineering</b> <b>01/2019 – present</b></p> <p><b>University of Manchester, UK</b>  Research associate, <b>Applied Mathematics</b> <b>10/2015 – 12/2018</b></p> <ul style="list-style-type: none"> <li>• <i>Ultrasonic propagation in complex media</i> - EPSRC (EP/M026205/1)</li> <li>• Responsible for mathematical modelling and numerical implementation. Strong ties with experiments (EP/M026310/1) and simulations (EP/M026302/1)</li> </ul> <p><b>NUI Galway, Ireland</b>  Ph.D. <b>Applied Mathematics</b> <b>09/2011 – 09/2015</b></p> <ul style="list-style-type: none"> <li>• Thesis title: <i>Incremental elastic surface waves and static wrinkles</i></li> <li>• Supervisor: Prof. Michel Destrade</li> </ul> <p><b>University of Campinas, Brazil</b> (QS 2nd best university in Latin America)  M.Sc. <b>Applied Mathematics</b>, Grade 96% <b>03/2009 – 05/2011</b>  Computational geophysics group</p> <ul style="list-style-type: none"> <li>• Thesis: <i>Nonlinear Elasticity with Radial Symmetry</i></li> <li>• Emphasis in wave scattering and propagation in Geophysics.</li> </ul> <p><b>B.Sc. Applied Mathematics</b>, Grade 83% <b>03/2005 – 12/2008</b></p> <ul style="list-style-type: none"> <li>• Emphasis on Mechanics with a minor in <b>Computer Science</b></li> </ul>	
TEACHING EXPERIENCE	<p><b>Qualification</b>  Teaching and learning course - (5 ECTS) NUI Galway <b>2013</b></p> <p><b>University of Sheffield</b>  <i>Modules</i> <b>09/2014 – 06/2015</b></p> <ul style="list-style-type: none"> <li>• The Dynamics of Aerospace Structures (AER291). I gave lectures and prepared content for BEng and MEng Aerospace. I provided feedback through Discussion Forums and recorded videos. <b>01/2020 – 06/2020</b></li> <li>• Matlab for Engineers (MEC133). I developed all the content and gave lectures. The learning was based around a series of interactive problems to solve using Matlab Grader. I provided feedback through live online meetings, recorded videos, and a Discussion Forum. <b>10/2020 – 06/2021</b></li> </ul> <p><b>University of Manchester</b>  <i>Supervision</i></p> <ul style="list-style-type: none"> <li>• Informal Ph.D supervisor, Erik Garcia Neefjes, working on thermo-visco-elastic waves. Erik is on track to complete his PhD on time. <b>09/2017 – present</b></li> </ul>	

- Final year undergraduate on *Acoustic Scattering from Cylinders*. Janni Harju compared multiple scattering theory with numerical software. **2018**
- Summer intern *Modelling the Bladder using Non-Linear Elasticity*. Imagining the bladder as a rubber material, Farid Breffni Hounat found the optimal material to sustain varied internal fluid pressure. **2017**
- Summer intern *Using elastic waves to measure initial stress*. Sara Ilhac related bulk wave speeds with directions of tension. **2016**

#### *Tutorials*

**09/2015 – 06/2018**

- 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**

- FAST - Fast Analysis of Stress in rail Tracks: an ultrasonic method** **2020**  
**Principal Investigator:** Robert Dwyer-Joyce, Artur L. Gower, Roger Lewis  
**Funding Value:** £86k  
**Funder:** European Commission - Horizon 2020 / H2020, In2Track2 (Main Funder), Network Rail Limited
- Longitudinal Rail Stress Measurement using Ultrasound** **2019**  
**Principal Investigator:** Robert Dwyer-Joyce, Artur L. Gower, Roger Lewis  
**Funding Value:** \$150k  
**Funder:** Federal Railroad Administration (USA)
- 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
	<b>Title:</b> Skin deep: the mechanics of skin	
	<b>Principal Investigators:</b> Artur L. Gower and Michel Destrade	
	<b>Funding Value:</b> €42k	
	Brazilian National Council for Scientific and Technological Development, M.Sc. fellowship (rank 1/45)	02/2009 - 03/2011
	<b>Title:</b> Nonlinear elastodynamics with radial symmetry	
	<b>Principal Investigator:</b> Artur L. Gower	
	<b>Funding Value:</b> R\$29k ( $\approx$ 5.5k)	
	Sao Paulo Research Foundation Undergraduate Research Scholarship	
	<b>Title:</b> Acoustic diffraction with Kirchhoff modelling	03/2007 - 02/2008
	<b>Principal Investigator:</b> Artur L. Gower and Lucio T. Santos	
	<b>Funding Value:</b> R\$6k ( $\approx$ 1.1k)	
	<b>Title:</b> Introduction to discrete chaotic dynamics	03/2006 - 02/2007
	<b>Principal Investigator:</b> Artur L. Gower and Lucio T. Santos	
	<b>Funding Value:</b> R\$6k ( $\approx$ 1.1k)	
RECENT SOFTWARE	[S3] A.L. Gower and J. Deakin. A Julia library for simulating, processing, and plotting multiple scattering of waves. <a href="#">MultipleScattering.jl</a> , GitHub, MIT License.	
	[S2] A.L. Gower. A Julia library to calculate the effective wave reflection and transmission in material random materials. <a href="#">EffectiveWaves.jl</a> , 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. <a href="#">EntropyGO</a> , GitHub, MIT License.	
SUBMITTED	[16] 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”, <i>submitted</i> , (2020)	
REFEREED JOURNAL PAPERS	Total citations: 216, according to my <a href="#">Google Scholar</a> .	
	[15] A.L. Gower, W.J. Parnell, I.D. Abrahams, “Multiple Waves Propagate in Random Particulate Materials”, <i>SIAM Journal on Applied Mathematics</i> (preprint), 79.6 (2019)	
	[14] A.L. Gower, I.D. Abrahams, W.J. Parnell, “A proof that multiple waves propagate in ensemble-averaged particulate materials”, <i>Proceedings of the Royal Society A</i> (preprint), 475.2229 (2019)	
	[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”, <i>Europhysics Letters</i> , (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”, <i>Proceedings of the Royal Society A</i> (preprint), 474.2212 (2018)	
	[11] A. Agosti, A.L. Gower, P. Ciarletta, “The constitutive relations of initially stressed incompressible Mooney-Rivlin materials”, <i>Mechanics Research Communications</i> , 93, (2018)	
	[10] A.L. Gower, T. Shearer, P. Ciarletta, “A new restriction for initially stressed elastic solids”, <i>Quarterly Journal of Mechanics and Applied Mathematics</i> , 70(2017)	
	[9] M. Carfagna, M. Destrade, A.L. Gower, A. Grillo, “Oblique wrinkles”, <i>Philosophical Transactions of the Royal Society A</i> , Invited contribution to the themed issue on <i>Patterning through instabilities in complex media</i> , 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

- 24hr Inspire for Life. A talk on ”Sensing the world with sound”. These science talks raise money for cancer charities. **03/2020**
- Pint of Science - Sheffield. A talk about science to the general public. **05/2019**
- 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**

## LEADERSHIP

- **Early Career Group - UK Acoustics Network** (*Coordinator*) **9/02/2018–present**  
Two summer schools to train early career acousticians (6–9/08/2018, 5–9/08/2019), and a workshop on academic-industrial collaboration (8–9/04/2019).
- **Constitutive Behaviour of Soft Tissues** (*Co-organiser*) **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** (*Co-organiser*) **8–9/11/2014**  
An annual international mechanics conferences
- **Irish Applied Maths Research Students' Meeting** (*Co-organiser*) **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** (*Co-organiser*) **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

Below are recent invited talks from workshops/conferences/seminars.

- **UCL Applied Maths Seminar**, “Multiple waves propagate in complex media”, London, UK **03/2020**
- **Cardiff - Applied and Computational Mathematics Seminar**, “Waves in Particulate Materials”, Cardiff, UK **02/2020**
- **International Congress on Industrial and Applied Mathematics (ICIAM2019)**, talk in symposium “Waves in multiple-scattering media”, Valencia, Spain **06/2019**
- **Strathclyde Applied Mathematics Seminar**, “Waves in Particulate Materials: Beyond Low Frequencies”, Glasgow, UK **05/2019**
- **Wave Chaos Seminar**, “Waves in complex random media”, Wave Modelling Research Group, Nottingham, UK **10/2018**
- **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, Bremen, 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**