Artur L. Gower

Curiculum Vitae

Contact Information

School of Mathematics
The University of Manchester
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Research Wave scattering & propagation, solid mechanics, and optimisation.

Programming Julia, Mathematica, C, C++, Matlab, Bash, and TEX (LATEX, BIBTEX, TikZ).

Academic History

Univeristy of Manchester, UK
Research associate, Applied Mathematics **10/2015 – 09/2018**

- Ultrasonic propagation in complex media - EPSRC (EP/M026205/1)
- Responsible for mathematical modelling and numerical implementation. Strong ties with experiments (EP/M026310/1) and simulations (EP/M026302/1).

NUI - Galway, Ireland
Ph.D., Applied Mathematics **09/2011 – 09/2015**

- Thesis Topic: *Nonlinear Modelling of Soft Matter: Waves, Growth, Instabilities, constitutive laws.*
- Adviser: Professor Michel Destrade

University of Campinas, Brazil (QS 2nd best university in Latin America)
M.Sc. 1st, Applied Mathematics, **03/2009 – 05/2011**
Computational geophysics group

- Thesis Topic: *Nonlinear Elasticity with Radial Symmetry*
- Adviser: Assoc. Prof. Lucio Tunes dos Santos
- Area of Study: Continuum Mechanics and Numerical Analysis
- Candidacy Exams in *Linear Algebra*, *Functional Analysis*, $\mathbb{R}^n$ *Analysis*

B.Sc. 1st, Applied Mathematics **03/2005 – 12/2008**

- Emphasis on Theoretical Mechanics with Minor in Computer Science
- Thesis Topic 1: *Introduction to Discrete Chaotic Dynamics*
- Thesis Topic 2: *Wave Reflection through Kirchhoff Modelling*

Teaching experience

Qualification
Teaching and learning course - National University of Ireland Galway **2013**

University of Manchester
Tutorials **09/2015 - 06/2018**

- Lead problem solving on calculus, linear algebra, complex analysis to B.Sc. mathematics and B.Sc. engineering.
- Grade and give feedback on weekly assignments.

Supervision **09/2015 - 06/2018**

- Final year undergraduate projects, summer interns, and assist PhD students.

The National University of Ireland Galway

Tutorials and lectures **09/2014 - 06/2015**

- Teach tutorials, and substitute lectures, on Fluid Mechanics and Nonlinear Elasticity to final year B.Sc. mathematics.
- Grade and give feedback on weekly assignments.

Tutorials **09/2011 - 06/2014**

- Lead problem solving on vector calculus, mathematical modelling, linear algebra, mathematical methods to B.Sc. engineering, physics and mathematics.
- Grade exams and give in class feedback.

Drop-in centre **03/2012 - 11/2014**

- Teach at the centre for the Support for Undergraduate Mathematics (SUMs).

University of Campinas

Lectures **02/2010 - 07/2010**

- Lecture a course on analytic geometry with vectors to B.Sc. chemical engineering.
- Prepare lectures, write and grade exams.

Funding

Irish Research Council, PhD fellowship **09/2013 - 09/2015**
Title: nonlinear Modelling of soft matter
Principal Investigators: Artur L Gower & Michel Destrade
Funding Value: k€46

Hardiman Scholarship, PhD fellowship **09/2011 - 09/2013**
Title: skin deep, the mechanics of skin through the formation of wrinkles
Principal Investigators: Artur L Gower & Michel Destrade
Funding Value: k€84

Brazilian National Council for Scientific and Technological Development, MSc fellowship - (I ranked 1st for this fellowship) **02/2009 - 03/2011**
Title: nonlinear elastodynamics with radial symmetry
Principal Investigator: Artur L Gower
Funding Value: kR$29

Sao Paulo Research Foundation Undergraduate Research Scholarship
Title: acoustic diffraction with kirchhoff modelling **03/2007 - 02/2008**
Principal Investigator: Artur L Gower & Lucio T Santos
Funding Value: kR$6

Title: introduction to discrete chaotic dynamics **03/2006 - 02/2007**
Principal Investigator: Artur L Gower & Lucio T Santos
Funding Value: kR$6

Recent Software

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

[S2] A.L. Gower. A Julia library to calculate the effective waves travelling in materials comprised of randomly distributed particles or inclusions. EffectiveWaves.jl, 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, MIT License.

Pre-prints

[13] A.L. Gower, R.M. Gower, J. Deakin, W, J. Parnell, I. D. Abrahams, Learning about random media from near-surface backscattering: using machine learning to measure particle size and concentration, *arXiv preprint*, (2018)1801.05490

Refereed Journal Papers

Citations: 106, h-index: 6, according to Google Scholar.
IF = Impact Factor and **GS** = Google Scholar citations.

[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 to appear) {**IF**:2.146|**GS**:0}

[11] A. Agosti, A. L. Gower, P. Ciarletta, The constitutive relations of initially stressed incompressible Mooney-Rivlin materials, *Mechanics Research Communications*, (2017) 2017.11.002. {**IF**:1.667|**GS**:0}

[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) p.455-478. {**IF**:1.213|**GS**:1}

[9] M. Carfagna, M. Destrade, A. L. Gower, A. Grillo, Oblique wrinkles, *Proceedings of the Royal Society A*, Themed Issue on Patterning through instabilities in complex media, 375 (2017) 2016.0158. {**IF**:2.146|**GS**:2}

[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) p.242-253. {**IF**:4.255|**GS**:7}

[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) 24390. {**IF**:4.259|**GS**:3}

[6] R.M. Gower, A.L. Gower, High order reverse automatic differentiation with emphasis on the third order, *Mathematical Programming SERIES A*, 155 (2016) p.81-103. {**IF**:1.984|**GS**:7}

[5] A.L. Gower, P. Ciarletta, M. Destrade, Initial stress symmetry and its application in elasticity, *Proceedings of the Royal Society A*, 471 (2015) 2015.0448. {**IF**:2.15|**GS**:10}

[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 Fiber-Reinforced Materials, 95 (2015) p. 217-229. {**IF**:1.069|**GS**:1}

[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) p.48-60. {**IF**:3.048|**GS**:57}

[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 [invited contribution], 50 (2013) p.1218-1228. {**IF**:1.303|**GS**:6}

[1] P. Ciarletta, M. Destrade, A.L. Gower, Shear instability in skin tissue, *Quarterly Journal of Mechanics and Applied Mathematics*, 66 (2013) p.273-288. {**IF**:1.213|**GS**:11}

Other Papers

[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)

[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 |*The International Journal of Non-Linear Mechanics* |*IMA Journal of Applied Mathematics* |*SIAM Journal of Applied Mathematics* |*ZAMP* - Journal of Applied Mathematics and Physics |*Acta Acustic United with Acustica*

Outreach

- Science Showdown! *How can we measure the invisible: the mathematics of jiggly waves*. An event promoting science to a wider audience in Manchester. **03/2017**
- Science Experience Workshop: once a year, for a few days, I gave maths puzzles and showed videos from research to high school students. **2011 - 2017**
- 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 Organized

- Acoustics early career summer school, 6-9 Aug 2018 (*Co-organizer*)
  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: connecting experimental and modelling perspectives, 31 Aug-2 Sep 2016 (*Co-organizer*)
  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), 8-9th of December 2014 (*Co-organizer*)
  An anual international mechanics conferences.
- The First Irish Applied Mathematics Research Students' Meeting, 11th of December 2014 (*Co-organizer*)
  Organized by the first SIAM student chapter of Ireland, this meeting brought together postgraduates working in applied mathematics.
- Stokes Modelling Workshop, 23rd-26th of June 2014 (*Co-organizer*)
  A four-day undergraduate modelling workshop, in the same style as the ESGI.

Recent Talks

- Bremen Workshop on Light Scattering 2018, Characterising particulate random media from near-surface backscattering, Bremem, Germany, Mar 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, Jun 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, Jun 2017
- Constitutive behaviour of soft tissues: connecting experimental and modelling perspectives, *Constitutive modelling of initially stressed elastic solids*, Manchester, UK, Sep 2016