ANTHONY GRUBER

anthony.gruber.d@gmail.com ⋄ (512) · 658 · 9672
https://agrubertx.github.io

EDUCATION

Texas Tech University *August 2019*
Ph.D. Mathematics (Calc. Var. and Geometric PDE)
Overall GPA: **4.0** (*summa cum laude*)

M.S. in Mathematics *May 2017*
Overall GPA: **4.0** (*summa cum laude*)

B.G.S. in Mathematics/Chemistry/Music Performance *May 2015*
Overall GPA: **3.9** (*summa cum laude*)
183 credit hours completed

- Also attended Ohio Wesleyan University for 5 semesters from 2011-2013.
- Awarded Dean's list all semesters at both OWU and TTU.

PROFESSIONAL EXPERIENCE

Florida State University January 2021—Present
Postdoctoral Research Associate *Tallahassee, FL: deployed in Columbia, SC*

- Advised by Prof. Max Gunzburger on the design of new reduced-order models, improved time-stepping algorithms, and the spin-up problem for the simulation of ocean dynamics.
- Further advised on related work by Prof. Lili Ju and Prof. Zhu Wang at the University of South Carolina.
- Funded by DOE grant DE-SC0020418: Efficient and Scalable Time-Stepping Algorithms and Reduced-Order Modeling for Ocean System Simulations.

Texas Tech University August 2019–December 2020
Assistant Professor of Practice *Lubbock, TX: deployed in San Jose, Costa Rica*

- Program director of the Dept. of Mathematics at the TTU satellite campus in San Jose.
- Taught a 2-2 load of mathematics courses, conducted research, and served the University as needed. Occasionally provided short courses to local professionals. See "Technical Skills" section below for a teaching resume.
- Coordinated with TTU faculty and administration state-side to further the University mission in Costa Rica.
- Funded by Edulink Inc. in conjunction with TTU.

Oak Ridge National Laboratory June 2018–August 2018
NSF Graduate Research Fellow *Oak Ridge, TN*

- Advised by Dr. Robert Bridges on a project called Active Manifolds (see publications below) applying geometric methods to data science problems involving high-dimensional function approximation.
- Established mathematics justifying the method and implemented new algorithms in Python.
- Produced results specially selected for presentation to the leaders of the Computing and Computational Sciences Division at ORNL.
- Funded through the NSF Mathematical Sciences Graduate Internship (MSGI) program.

Texas Tech University August 2015–August 2019
Graduate Part-Time Instructor *Lubbock, TX*

- Served as instructor of record for a 2-2 load of mathematics courses each year.
- Experience teaching large (up to 170 students), small, and online classes.
- Funded through scholarships/endowments at TTU.

University of Texas at Dallas May 2014–August 2014
Materials Science Research Intern *Richardson, TX*

- Designed, constructed, and characterized TiSi and CrB2-Si-SiC thin-film resistors using a combination of lithography, x-ray photoelectron spectrometry, and Hall-effect measurements.
- Worked closely with a diverse team under Prof. Manuel Quevedo, some members of which spoke no English. Presented results at weekly meetings.

· Generated data that facilitated the identification of a superior ratio of Ti:Si, thereby improving resistivity of previous TFR's by 30%.
· Funded through the NSF Research Experiences for Undergraduates (REU) program.

PUBLICATIONS

In reverse chronological order—preprints available at my website or upon request.

Preprint Articles

1. A. Gruber, E. Aulisa. "Quasiconformal Mappings for Surface Mesh Optimization", (under review).
2. A. Gruber, M. Gunzburger, L. Ju, Y. Teng, Z. Wang. "Nonlinear Level Set Learning for Function Approximation on Sparse Data with Applications to Parametric Differential Equations", (under review).
3. A. Gruber, A. Pámpano, M. Toda. "On p-Willmore Disks with Boundary Energies", (under review).
4. A. Gruber. "Parallel Codazzi Tensors with Submanifold Applications", (under review).
5. A. Gruber, M. Toda, H. Tran. "Stationary Surfaces with Boundaries", (under review).

Journal Articles

1. A. Gruber, A. Pámpano, M. Toda. "Regarding the Euler-Plateau Problem with Elastic Modulus", *Ann. Mat. Pura Appl.*, (2021). https://doi.org/10.1007/s10231-021-01079-5.
2. A. Gruber, E. Aulisa. "Computational p-Willmore Flow with Conformal Penalty", *ACM Trans. Graph.* 39, 5, Article 161 (September 2020), 16 pages. https://doi.org/10.1145/3369387.
3. A. Gruber, M. Toda, H. Tran. "On the variation of curvature functionals in a space form with application to a generalized Willmore energy", *Ann. Glob. Anal. Geom.* 56, 147–165 (2019). https://doi.org/10.1007/s10455-019-09661-0.

Articles in Refereed Conference Proceedings

1. A. Gruber, E. Aulisa. "Quaternionic remeshing during surface evolution", *Proceedings of the 18th International Conference of Numerical Analysis and Applied Mathematics*, Rhodes, Greece 2020, (to appear).
2. A. Gruber, M. Toda, H. Tran. "Willmore-stable minimal surfaces", *Proceedings of the 18th International Conference of Numerical Analysis and Applied Mathematics*, Rhodes, Greece 2020, (to appear).
3. E. Aulisa, A. Gruber, M. Toda, H. Tran. "New Developments on the p-Willmore Energy of Surfaces", *Proceedings of the Twenty-First International Conference on Geometry, Integrability and Quantization*, Ivaïlo M. Mladenov, Vladimir Pulov and Akira Yoshioka, eds. Sofia: Avangard Prima, 2020.
4. R. Bridges, A. Gruber, C. Felder, M. Verma, C. Hoff. "Active Manifolds: Reducing high dimensional functions to 1-D; A non-linear analogue to Active Subspaces". *Volume 97: International Conference on Machine Learning*, 9-15 June 2019, Long Beach, California, USA. PMLR 97:764-772, http://proceedings.mlr.press/v97/bridges19a.html.

Other

1. A. Gruber, "Curvature Functionals and p-Willmore Energy", *TTU Electronic Thesis and Dissertation Repository*, 2019, https://ttu-ir.tdl.org/handle/2346/85351.

PRESENTATIONS/SERVICE/INVOLVEMENT

Invited External Presentations

· A. Gruber, Paper presentation, 18th International Conference of Numerical Analysis and Applied Mathematics (virtual), Sep 17-23, 2020, "Quaternionic remeshing during surface evolution", Rhodes, Greece. (30 min; Sep 17, 2020.)
· A. Gruber, Paper presentation, 18th International Conference of Numerical Analysis and Applied Mathematics (virtual), Sep 17-23, 2020, "Willmore-stable minimal surfaces", Rhodes, Greece. (30 min; Sep 17, 2020.)

· A. Gruber, Invited talk, AMS special session #1159, Geometry of Submanifolds and Integrable Systems (virtual), Sep 12-13, 2020, "Codazzi tensors with parallel mean curvature", University of Texas at El Paso. (25 min; September 12, 2020.)

· A. Gruber, Plenarly lecture as early career speaker, 63rd Texas Geometry and Topology Conference (virtual), Apr 24-26, 2020, "Stationary surfaces for curvature functionals", Texas Tech University, Lubbock. (50 min; April 23, 2020.)

· R. Bridges (presenter), A. Gruber, C. Felder, M. Verma, C. Hoff, Paper presentation, 36th International Conference on Machine Learning, June 9-15, 2019, "Active Manifolds: A non-linear analogue to Active Subspaces", Long Beach, California.

· E. Aulisa, A. Gruber, M. Toda (presenter), H. Tran, Plenary lecture, XXIst International Conference on Geometry, Integrability, and Quantization, June 3-9, 2019, "p-Willmore Energies", Bulgarian Academy of Science, Institute of Biophysics, Bulgaria.

Campus or Departmental Talks

· A. Gruber, Seminar talk, "Optimal Quasiconformal Mappings with Prescribed Boundary" (virtual), Probability, Geometry, and Mathematical Physics group, Texas Tech University, Lubbock. (50 min; April 7, 2021).

· A. Gruber, Seminar talk, "Geometric Flows via Finite Element Methods" (virtual), Elasticity group, Texas Tech University, Lubbock. (50 min; Dec 2, 2020.)

· A. Gruber, Seminar talk, "Variational Aspects of Curvature Functionals", Elasticity group, Texas Tech University, Lubbock. (50 min; Sep 2, 2020.)

· A. Gruber, Seminar talk, "Computing stationary solutions to p-Willmore flow", Applied Mathematics group, Texas Tech University. (50 min; April 22, 2020.)

· A. Gruber, Seminar talk, "A conformally-adjusted Willmore flow of closed surfaces", Applied Mathematics group, Texas Tech University, Lubbock. (50 min; May 8, 2019.)

· A. Gruber, Seminar talk, "Curvature functionals and p-Willmore energy", Analysis group, Texas Tech University, Lubbock. (50 min; April 29, 2019.)

· A. Gruber, Seminar talk, "Active Manifolds: A geometric approach to dimension reduction for sensitivity analysis", ORNL Computational and Applied Mathematics group, Oak Ridge, Tennessee. (50 min; August 1, 2018.)

Invited Presentations Not Delivered

· A. Gruber, E. Aulisa, Paper presentation, "Computational p-Willmore Flow with Conformal Penalty", ACM SIGGRAPH 2021, Aug 1-5, Los Angeles, California.

· A. Gruber, XXIst International Conference on Geometry, Integrability, and Quantization, June 3-9, 2019, "Abstract Curvature Functionals and p-Willmore Energy", Bulgarian Academy of Science, Institute of Biophysics, Bulgaria.

Editorial Experience

· Organizer, session #54, "Elastic curves and surfaces with applications and numerical representations", 18th International Conference of Numerical Analysis and Applied Mathematics, Sep 17-23, 2020.

· Reviewer for the Electronic Journal of Statistics (EJS).

Professional Organizations

· Member, American Mathematical Society
· Member, Association of Computing Machinery

TECHNICAL SKILLS

Courses Taught

· Advanced Calculus I (TTU Math 4350)
· Foundations of Algebra I (TTU Math 3360)
· Higher Mathematics II (PDEs) for Scientists and Engineers (TTU Math 3351)
· Higher Mathematics I (ODEs) for Scientists and Engineers (TTU Math 3350)
· Introduction to Critical Reasoning and Proof (TTU Math 3310)

- Calculus III with Applications (TTU Math 2450)
- Calculus II with Applications (TTU Math 1452)
- College Algebra (TTU Math 1320)
- Intro. to Data Analytics (10-hour short course self-developed for TTUCR)

Computer Languages and Technologies

- Python (working familiarity), C++ (working familiarity), Wolfram Mathematica (some experience), MathWorks MATLAB (limited experience).
- MacOS/Unix, PyTorch, Blender, ParaView, Adobe Illustrator, LaTeX.

Laboratory Experience

- Chromatography: TLC, HPLC, GC, column.
- Deposition: CSS, PL.
- Acid/base titration; chemical distillation/recrystalization.
- Bomb calorimetry; lithography; Hall voltage measurement.
- Class 1000 cleanroom experience.

OTHER AWARDS AND HONORS

- Nominated for TTU Outstanding Dissertation award, 2020.
- SIAM Graduate Scholarship, TTU chapter, 2018–2019, $600.
- Gordon Fuller Graduate Scholarship, TTU Mathematics Department, 2018–2019, $825.
- Travel stipend, John H. Barrett memorial lectures on mean curvature flow, University of Tennessee at Knoxville, 5/2018, $600.
- Patrick L. Odell Graduate Scholarship, TTU Mathematics Department, 2016–2017, $350.
- Proven Achievers Transfer Scholarship, Texas Tech University, 2014–2016, $6,500/yr.
- Leland F. and Helen Schubert Honors Scholarship, Ohio Wesleyan University, 2011–2014, $35,000/yr.
- Music Performance Merit Scholarship, Ohio Wesleyan University, 2011–2014, $7,500/yr.
- CRC Press Chemistry Achievement Award, Ohio Wesleyan University, 2012.