

# ANTHONY GRUBER

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<https://myweb.ttu.edu/agruber>

## EDUCATION

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### Texas Tech University

August 2019

Ph.D. Mathematics

Specialization: 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

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

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### Florida State University

January 2021—Present

*Postdoctoral Research Associate*

*Tallahassee, FL: deployed in Columbia, SC*

- Advised by Dr. 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 Dr. Lili Ju and Dr. 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 NSF Mathematical Sciences Graduate Internship (MSGI) program,

**Texas Tech University**  
*Graduate Part-Time Instructor*

August 2015–August 2019  
*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**  
*Materials Science Research Intern*

May 2014–August 2014  
*Richardson, TX*

- Designed, constructed, and characterized TiSi and CrB<sub>2</sub>-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 Dr. Manuel Quevedo, some members of which spoke no English at all. 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 NSF Research Experiences for Undergraduates (REU) program,

## PUBLICATIONS

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

### Journal Articles

1. A. Gruber, A. Pámpano, M. Toda. "Regarding the Euler-Plateau Problem with Elastic Modulus", (under review).
2. A. Gruber. "Parallel Codazzi Tensors with Submanifold Applications", (under review).
3. 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>.
4. A. Gruber, M. Toda, H. Tran. "Stationary Surfaces with Boundaries", (under review).
5. 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*, Ivailo 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

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### Invited 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, Plenary 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, “Geometric Flows via Finite Element Methods”, 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.)

### 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, Society for Industrial and Applied Mathematics, 2015–present.
- Member, American Mathematical Society, 2015–present.

## Attended Without Contributing

- Virtual Workshop on Ricci and Scalar Curvature, Aug. 4–Sep. 8, 2020.
- John H. Barrett Memorial Lectures, University of Tennessee, May 29–June 1, 2018.
- West Texas Applied Math Graduate Minisymposium, Texas Tech University, 14 Apr., 2018.
- Texas Geometry and Topology Conference, Texas Tech University, Feb. 17–19, 2017.

## TECHNICAL SKILLS

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### 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 Skills

- C++ (working familiarity)
- Python (working familiarity)
- MATLAB (limited experience)
- Wolfram Mathematica (working familiarity)

### Laboratory Experience

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

## OTHER AWARDS AND HONORS

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- 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**.
- 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.