

Paul Cazeaux

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Citizenship: **France**

Permanent residency: **USA**

█ Contact information

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█ Current position

2022-* **Tenure-Track Assistant Professor, Department of Mathematics, Virginia Tech**

█ Previous employment

2018-2022 **Tenure-Track Assistant Professor, Department of Mathematics, University of Kansas**

2017-2018 **Adams Visiting Assistant Professor, Department of Mathematics, University of Kansas**

2014-2017 **Postdoctoral Researcher, School of Mathematics, University of Minnesota**

2013-2014 **Postdoctoral collaborator, EPF Lausanne, Chair of Computational Mathematics and Simulation Science (MCSS), SB Mathematics Institute of Computational Science and Engineering (MATHICSE)**

Sept.-Oct. **UPMC Researcher, Université Pierre et Marie Curie (Paris VI)**

2013 ○ Industrial Project with Metrolab, Feb.-Oct. 2013

2012-2013 **ATER (Teaching and Research Assistant), UPMC (Paris VI)**

2009-2012 **Teaching Assistant, UPMC (Paris VI)**

Education

- Sept. 2009 **PhD Thesis in Applied Mathematics at Université Pierre et Marie Curie (Paris VI)**, under the supervision of Céline Grandmont (Inria) and Yvon Maday (LJLL), within a joint PhD program between Paris VI and Brown University (Providence, USA)
- 2010 **Diplôme de l'ENS**, *Mathematics, Ecole Normale Supérieure (ENS Paris), France*
- 2006–2008 **Master 2 Mathematics and Applications with honors, UPMC (Paris VI)**
- 2005–2006 **Bachelor degree in Mathematics, Paris VII/ENS**
- July 2005 **Enrolled, Ecole Normale Supérieure (ENS)**, *National rank 30th*

Grants and/or Funded Projects

Funded Proposals

1. Cazeaux, P. (Principal Investigator). *Multi-scale Modeling of two-dimensional Materials and van der Waals Heterostructures*, Simons Foundation Collaboration Grants for Mathematicians. \$42,000. September 1, 2022–August 31, 2027. (Refereed/Competitive)
2. Cazeaux, P. (Principal Investigator). *Novel Computational Mathematics for Aperiodic Multilayers*. National Science Foundation Award #DMS-1819220, \$81,446 requested/received, July 1, 2018–June 30, 2022. (Refereed/Competitive)

Internal Funding

1. Cazeaux, P. (Principal Investigator). *Topological Dirac models for electronic transport in 2D heterostructures*. New Faculty General Research Fund (NFGRF), University of Kansas, \$8,000 requested/received, September 4 2020 – September 4 2022. (Refereed)

Publications

Published works.

- [1] Z. Zhu, P. Cazeaux, M. Luskin and E. Kaxiras. Modeling mechanical relaxation in incommensurate trilayer van der Waals heterostructures. *Physical Review B* **101**, 224107, 14 pages, 2020.
- [2] P. Cazeaux, M. Luskin and D. Massatt. Energy minimization of two-dimensional incommensurate heterostructures. *Archive for Rational Mechanics and Analysis* **235**, pp. 1289–1325, 2020.
- [3] H. Yoo, R. Engelke, S. Carr, S. Fang, K. Zhang, P. Cazeaux, S.H. Sung, R. Hovden, A.W. Tsen, T. Taniguchi, K. Watanabe, G-C. Yi, M. Kim, M. Luskin, E.B. Tadmor, E. Kaxiras and P. Kim. Atomic and electronic reconstruction at the van der Waals interface in twisted bilayer graphene. *Nature Materials* **18**, pp. 448–453, 2019.

- [4] P. Cazeaux and J.S. Hesthaven. Projective multiscale time-integration for electrostatic particle-in-cell methods. *Computer Physics Communications* **236**, pp. 34-50, 2019.
- [5] S. Carr, D. Massatt, S.B. Torrisi, P. Cazeaux, M. Luskin and E. Kaxiras. Relaxation and domain formation in incommensurate two-dimensional heterostructures. *Physical Review B* **98**, 224102, 7 pages, 2018.
- [6] A. Bakhta, E. Cancès, P. Cazeaux, S. Fang and E. Kaxiras. Compression of Wannier functions into Gaussian-type orbitals. *Computer Physics Communications* **230**, pp. 27-37, 2018.
- [7] S. N. Shirodkar, M. Mattheakis, P. Cazeaux, P. Narang, M. Soljačić and E. Kaxiras. Quantum plasmons with optical-range frequencies in doped few-layer graphene. *Physical Review B*, **97**, 195435, 6 pages, 2018.
- [8] P. Cazeaux and M. Luskin. Cauchy-Born strain energy density for coupled incommensurate elastic chains. *ESAIM: Mathematical Modelling and Numerical Analysis* **52**, pp. 729-749, 2018.
- [9] S. Carr, D. Massatt, S. Fang, P. Cazeaux, M. Luskin and E. Kaxiras. Twistronics: manipulating the electronic properties of two-dimensional layered structures through their twist angle. *Physical Review B* **95**, 075420, 6 pages, 2017.
- [10] E. Cancès, P. Cazeaux and M. Luskin. Generalized Kubo formulas for the transport properties of incommensurate 2D atomic heterostructures. *Journal of Mathematical Physics* **58**, 063502, 23 pages, 2017.
- [11] P. Cazeaux, M. Luskin and E. Tadmor. Analysis of rippling in incommensurate one-dimensional coupled chains. *SIAM: Multiscale Modeling & Simulation* **15(1)** pp. 56-73, 2017.
- [12] G. Tritsarlis, S. Shirodkar, T. Kaxiras, P. Cazeaux, M. Luskin, P. Plechac and E. Cancès. Perturbation theory for weakly coupled two-dimensional layers. *Journal of Material Research* **31(7)** pp. 959-966, 2016.
- [13] P. Cazeaux and O. Zahm. A fast boundary element method for the solution of periodic many-inclusion problems via hierarchical matrix techniques. *ESAIM: Proceedings and Surveys* **48**, pp. 156-168, 2015.
- [14] P. Cazeaux, C. Grandmont and Y. Maday. Homogenization of a model for the propagation of sound in the lungs. *SIAM: Multiscale Modeling & Simulation* **13(1)**, pp. 43-71, 2015.
- [15] P. Cazeaux and C. Grandmont. Homogenization of a multiscale viscoelastic model with nonlocal damping, application to the human lungs. *Mathematical Models & Methods in Applied Sciences* **25(6)**, pp. 1125-1177, 2015.
- [16] P. Cazeaux and J.S. Hesthaven. Multiscale modelling of sound propagation through the lung parenchyma. *ESAIM: Mathematical Modelling and Numerical Analysis* **48**, pp. 27-52, 2013.

Works Accepted for Publication.

- [17] H. Al Daas, G. Ballard, P. Cazeaux, E. Hallman, A. Miedlar, M. Pasha, T. Reid, and A. Saibaba. Randomized algorithms for rounding in the Tensor-Train format. *Accepted for publication in the SIAM Journal on Scientific Computing (SISC)*. *arXiv preprint: <https://arxiv.org/abs/2110.04393>*.

Works Submitted.

- [18] G. Bal, P. Cazeaux, D. Massatt, S. Quinn. Mathematical models of topologically protected transport in twisted bilayer graphene. *arXiv preprint: <https://arxiv.org/abs/2206.05580>*.
- [19] P. Cazeaux, D. Clark, R. Engelke, P. Kim and M. Luskin. Relaxation and domain wall structure of bilayer moire systems. *arXiv preprint: <https://arxiv.org/abs/2211.12274>*.
- [20] R. Engelke, H. Yoo, S. Carr, K. Xu, P. Cazeaux, R. Allen, A.M. Valdivia, M. Luskin, E. Kaxiras, M. Kim, J.H. Han and P. Kim. Non-Abelian topological defects and strain mapping in 2D moiré materials. *arXiv preprint: <https://arxiv.org/abs/2207.05276>*.

Invited Presentations

1. November 3, 2022. *Domain wall junctions and networks in Dirac topological materials*, Minisymposium on 'Advances in theory and computation of functional optical materials', 5th Meeting of the SIAM TX-LA Section, Houston, Texas, USA. (Invited talk)
2. March 30, 2022. *Dirac operators and domain wall networks in topological materials*, Minisymposium on 'Effective equations in quantum mechanics and quantum chemistry', The Twelfth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory (Waves2022), Athens, Georgia, USA. (Invited talk)
3. March 3, 2022. *Mathematical Modeling of 2D Materials and Moiré Structures across Scales*, Colloquium, Department of Mathematics, Virginia Tech, Blacksburg, Virginia, USA. (Invited talk)
4. October 9, 2021. *Effective modeling and simulations for atomic moiré 2D heterostructures*, Minisymposium on 'Recent Advances in Numerical Methods for Partial Differential Equations', AMS Fall Central Sectional Meeting. Online - originally scheduled in Creighton University, Omaha, Nebraska, USA. (Invited talk)
5. June 12, 2021. *Modeling and Computation for Incommensurate 2D Multilayers*, Featured Speaker, Workshop on Modeling of Electronic Structure in Material Science, 2nd edition (2D Materials), Modeling, Simulation and Data Analysis (MSDA) program, Mohammed VI Polytechnic University, Ben Guerir, Morocco. (Invited talk)
6. June 1, 2021. *Numerical Computation of Electronic Properties in Incommensurate Layered Structures*, Applied and Computational Mathematics Seminar, Center for Computational Engineering Science, RWTH Aachen University, Germany. (Invited talk)

7. May 27, 2021. *Computing the Kubo Conductivity for Incommensurate Layered Crystals Using Configuration Space*, Minisymposium on 'Numerical Methods for electronic structure calculations', SIAM Conference on Mathematical Aspects of Materials Science (MS21), Online - originally scheduled in Bilbao, Spain. (Invited talk)
8. February 21, 2021. *Practical Modeling for Twisted Multilayer 2D Materials*, Minisymposium on 'Frontiers in material modeling and device simulation: from nano- to meso-scale', SIAM Conference on Computational Science and Engineering (CSE21), Online - originally scheduled in Fort Worth, Texas, USA. (Invited talk)
9. March 5, 2020. *Twists and Misfits: Mathematical Modeling for Incommensurate 2D Materials*, Computational and Applied Mathematics Colloquium, Department of Statistics, the University of Chicago, Chicago, IL, USA. (Invited Talk)
10. January 13, 2020. *Relaxation of Incommensurate Bi- and Trilayer Heterostructures and Networks of Domain Walls*, Workshop on Theory and Computation for 2D Models, Institute for Pure and Applied Mathematics (IPAM), University of California, Los Angeles, CA, USA. (Invited Talk)
11. December 13, 2019. *Relaxation of 2D Incommensurate Heterostructures and Network of Domain Walls*, Minisymposium on 'Layered 2D Materials and Edge States', Society for Industrial and Applied Mathematics (SIAM) Conference on Analysis of Partial Differential Equations 2019 (PD19), La Quinta, CA, USA. (Invited Talk)
12. October 9, 2019. *Twists and Mismatches: Configuration Space Approaches for Modeling 2D Heterostructures*, European Research Council Synergy Grant 'Extreme-scale Mathematically-based Computational Chemistry' (ERC EMC²) kick-off meeting, Paris, France. (Invited Talk)
13. July 16, 2019. *Reduced Models for Electronic Conductivity Calculations in 2D Heterostructures*, Minisymposium on 'Molecular Simulation: Dynamics, Statistics, Learning and High-Performance Computing', International Congress on Industrial and Applied Mathematics (ICIAM), Valencia, Spain. (Invited Talk)
14. June 12, 2019. *Reduced Modeling for Electronic Conductivity Calculations in 2D Heterostructures*, Workshop on 'Mathematical and Numerical Analysis of Electronic Structure Models', Suzhou, China. (Invited Talk)
15. June 6, 2019. *Relaxation and Moire Patterns of Incommensurate 2D Heterostructures*, Seminar, School of Mathematical Sciences, Fudan University, Shanghai, China. (Invited Talk)
16. February 25, 2019. *Practical Computation of the Noncommutative Kubo Formula for the Conductivity in Incommensurate Multilayers*, Minisymposium on 'Recent Advances in Modeling and Numerical Analysis for Electronic Structure Calculations', SIAM Conference on Computational Science and Engineering (CSE19), Spokane, WA, USA. (Invited Talk)
17. February 8, 2019. *Relaxation and Moire Patterns of Incommensurate 2D Heterostructures*, Colloquium, Department of Mathematics and Statistics, University of Missouri-Kansas City, MO, USA. (Invited Talk)

18. November 19, 2018. *Mathematical and Numerical Models for Vertically Stacked 2D Materials*, Colloquium, Department of Mathematics, Texas A&M University, College Station, TX, USA. (Invited Talk)
19. October 20, 2018. *Optimization Techniques, Fractals and Other Things, using Julia*, Midwest Mathematics Inclusion and Diversity Workshop for Undergraduates (MMIDWU 2018), Iowa State University, Ames, IA, USA. (Invited Featured Speaker).
20. October 6, 2018. *Modeling Moire-Driven Mechanical Relaxation in Incommensurate Multilayer Structures*, Minisymposium on 'Recent Advances in Numerical PDEs', 4th Annual Meeting of the SIAM Central States Section, University of Oklahoma, OK, USA. (Invited Talk)
21. August 3, 2018. *Modeling and Computation of Electronic Properties in Incommensurate Stacks of 2D Materials*, Solid Math 2018: Mathematical and Numerical Methods for Solid State Physics (Satellite of the ICMP 2018 Conference), McGill University, Montreal, QC, Canada. (Invited Talk)
22. July 10, 2018. *Incommensurability in 2D Multilayer Materials: Non-Commutative Geometry to the Rescue of Numerical Computation*, Minisymposium on 'Modeling, Analysis and Numerical Computation for 2D Materials', SIAM Conference on Mathematical Aspects of Materials Science (MS18), Portland, OR, USA. (Invited Talk)
23. May 29, 2018. *Mathematical Models of Mechanical Relaxation in 2D Multilayer Structures*, Workshop on 'Analysis, Modeling, and Computation for Nanoscale Systems', Fields Institute for Research in Mathematical Sciences, Toronto, ON, Canada. (Invited Talk)
24. April 15, 2018. *Relaxation and Moiré Domain Formation in Incommensurate 2D Heterostructures*, Midwest Numerical Analysis Day 2018, University of Kansas, Lawrence, KS, USA. (Invited Talk)
25. March 7, 2018. *Modeling Electronic Transport Properties in Incommensurate 2D Multilayer Materials*, Applied Mathematics Seminar, Department of Mathematics, University of California, Berkeley, CA, USA. (Invited Talk)
26. February 9, 2018. *2D Multilayer Materials and Incommensuration. Non-Commutative Geometry to the Rescue of Numerical Computations* (in French: *Matériaux 2D Multi-Couches et Incommensurabilité. Géométrie Non-Commutative à la Rescousse du Calcul Numérique*), Séminaire de Mathématiques Appliquées, Collège de France, Paris, France. (Invited Talk)
27. January 30, 2018. *Modeling 2D Multilayer Materials: Non-Commutative Geometry to the Rescue of Numerical Computation*. Colloquium, Department of Mathematics, University of Massachusetts-Dartmouth, North Dartmouth, MA, USA. (Invited Talk)
28. September 30, 2017. *Numerical Modeling of Incommensurate Moiré Atomic Structures via C^* Algebras*, Minisymposium on 'Novel Numerical Methods for Multiphysics Problems', SIAM Central States Section (SIAM CSS) Conference Fort Collins, CO, USA. (Invited Talk)
29. May 19, 2017. *Numerical Modeling of Incommensurate Moiré Atomic Structures via C^* Algebras*, Hot Topics Workshop on 'Mathematical Modeling of 2D Materials', Institute for Mathematics and its Applications (IMA), Minneapolis, MN, USA. (Invited Talk)

30. March 13, 2017. *Geometry and the design of van der Waals 2D heterostructures*, Colloquium, Department of Physics and Astronomy, University of Kansas, Lawrence, KS, USA. (Invited Talk).
31. March 3, 2017. *Electronic Transport in Incommensurate Van Der Waals 2D Heterostructures*, Minisymposium on 'Numerical Methods for Electronic Structure Calculations: Ground State Properties', SIAM Conference on Computational Science and Engineering 2017 (SIAM CSE17), Atlanta, GA, USA. (Invited Talk)
32. February 15, 2017. *Mathematical Modeling and Numerical Simulations for Incommensurate Van Der Waals 2D Heterostructures*, Computational and Theoretical Chemistry Seminar, Department of Chemistry, University of Kansas, Lawrence, KS. (Invited Talk)
33. February 15, 2017. *C* Algebras, Modeling and Simulations for Incommensurate Van der Waals 2D Heterostructures*, Computational and Applied Mathematics Seminar, Department of Mathematics, University of Kansas, Lawrence, KS, USA.
34. January 27, 2017. *Mathematical Modeling and Numerical Simulations for Incommensurate Van Der Waals 2D Heterostructures*, Seminar, Mathematics Institute, University of Warwick, Coventry, United Kingdom. (Invited Talk)
35. January 17, 2017. *Mathematical Modeling and Numerical Simulations for Incommensurate Van Der Waals 2D Heterostructures*, Colloquium, Department of Mathematical Sciences, University of Delaware, Newark, DE, USA. (Invited Talk)
36. October 20, 2016. *Mathematical and Numerical Multiscale Modeling of Electronic Transport in Incommensurate 2D Heterostructures*, Smith Colloquium, Department of Mathematics, University of Kansas, Lawrence, KS, USA. (Invited Talk)
37. October 13, 2016. *Analysis and Numerical Simulation of Incommensurate 2D Layered Materials*, 8th International Conference on Multiscale Materials Modeling (MMM16), Dijon, France. (Invited Talk)
38. September 29, 2016. *Towards Multiscale Modeling of Incommensurate 2D Van der Waals Heterostructures*, Numerical Analysis and PDE Seminar Department of Mathematical Sciences, University of Delaware, Newark, DE, USA. (Invited Talk)
39. August 29, 2016. *Towards Multiscale Modeling of Incommensurate 2D Van der Waals Heterostructures*, Workshop on 'Coupled Mathematical Models for Physical and Biological Nanoscale Systems and Their Applications', Banff International Research Station for Mathematical Innovation and Discovery (BIRS), Banff, Canada. (Invited Talk)
40. July 7, 2016. *Towards Multiscale Modeling of Incommensurate 2D Van der Waals Heterostructures*, Centre Européen de Calcul Atomique et Moléculaire (CECAM) Workshop on 'Mathematical and Numerical Analysis of Electronic Structure Models', Roscoff, France. (Invited Talk)
41. April 26, 2016, *Modeling Conductivity: Incommensurate 2D Heterostructures and C*-Algebras*, Kaxiras group Seminar, Department of Physics, Harvard University, Cambridge, MA, USA. (Invited Talk)

42. October 27, 2015. *Cauchy-Born Rule for Incommensurate One-Dimensional Systems of Coupled Elastic Chains*, Symposium on 'Mechanics of Nanoscale Phenomena: Mechanics of 2D Materials', Society of Engineering Science (SES) 52nd Annual Technical Meeting, Texas A&M University, College Station, Texas. (Invited Talk)
43. October 22, 2014. *Coarse Multiscale Timestepping for Problems in Plasma Physics with Equation-Free Projective Integration*, Seminar, Centre de Recherches en Physique des Plasmas, Ecole Polytechnique Fédérale de Lausanne, Switzerland. (Invited Talk)
44. August 26, 2014. *Coarse Multiscale Timestepping for Problems in Plasma Physics with Equation-Free Projective Integration*, Berlin Mathematical School (BMS) Summer School on Applied Analysis for Materials, Berlin, Germany. (Invited Talk)
45. March 18, 2014. *Quelques Images d'Illustration pour les Méthodes PIC (Some Pictures Illustrating PIC Methods)*, Seminar, Cermics (Centre d'Enseignement et de Recherche en Mathématiques et Calcul Scientifique), Ecole des Ponts, Paris, France. (Invited Talk)
46. December 5, 2013. *A Mathematical Homogenized Model for the Mechanical Behavior of the Lungs' Parenchyma*, Colloquium, Département de Mathématiques, Université de Rouen, France. (Invited Talk)
47. October 10, 2013. *A Mathematical Homogenized Model for the Mechanical Behavior of the Lungs' Parenchyma*, Numerical Methods Seminar, Cermics, Ecole des Ponts, Paris, France. (Invited Talk)
48. January 29, 2013. *Two Homogenized Models for the Modeling of the Mechanical Behavior of the Pulmonary Parenchyma*, Groupe de Travail Numérique, Département de Mathématiques, Université Paris-Sud, Orsay, France. (Invited Talk)
49. November 12, 2012. *A Few Homogenized Models for the Modeling of the Mechanical Behavior of the Pulmonary Parenchyma*, Homogenization and Multiple Scales Seminar, Laboratoire Jacques Louis Lions, UPMC, Paris, France. (Invited Talk)

———— Invited Research Stays

1. Academic Visitor, Prof. E. Cances (INRIA and CERMICS Ecole des Ponts ParisTech), December 11-22 2021 and January 5-12 2022, Paris, France.
2. Academic Visitor, Prof. E. Cances (INRIA and CERMICS Ecole des Ponts ParisTech), Sorbonne Université, June 21-24, 2021, Paris, France.
3. January 13–17 2020. Workshop on 'Theory and Computation for 2D Models', Institute for Pure and Applied Mathematics, UCLA, CA, USA.
4. July 6—3, 2019. Academic Visitor, Prof. Yvon Maday (Sorbonne Université) and Prof. Eric Cancès (INRIA and CERMICS Ecole des Ponts ParisTech), Station Biologique de Roscoff - CNRS - Sorbonne Université, Roscoff, France.
5. June 10–17, 2019. Workshop on 'Mathematical and Numerical Analysis of Electronic Structure Models', Suzhou, China.

6. June 5–9, 2019. Academic Visitor, Prof. Jungong Xue, School of Mathematical Sciences, Fudan University, Shanghai, China.
7. January 14–18, 2019. Academic Visitor, Institute for Mathematics and its Applications (IMA), hosted by Prof. Luskin, Department of Mathematics, University of Minnesota, Minneapolis, MN, USA.
8. May 28–31, 2018. Workshop on 'Analysis, Modeling, and Computation for Nanoscale Systems', Fields Institute for Research in Mathematical Sciences, Toronto, ON, Canada.
9. March 25–31, 2018. IMA Workshop on 'Theory and Computation for Transport Properties in 2D Materials', IMA, Minneapolis, USA.
10. March 5–8, 2018. Academic visitor, Prof. Lin Lin, University of California, Berkeley and Lawrence Berkeley National Laboratory, Berkeley, CA, USA.
11. February 4–10, 2018. Research Visit with MATERIALS team, Inria Paris, France.
12. April 2–9, 2017. Research Visit with Prof. Petr Plechac, Department of Mathematical Science, University of Delaware, USA.
13. August 28–September 2, 2016. BIRS Workshop on 'Coupled Mathematical Models for Physical and Biological Nanoscale Systems and Their Applications', Banff, AL, Canada.
14. July 18–22, 2016. Research Visit with Prof. Eric Cancès, CERMICS, Ecole des Ponts, Noisy-Champs, France.
15. September 2015–May 2016. Research Visit, Department of Physics, Harvard's Paulson School of Engineering and Applied Sciences, Harvard University, Boston, MA, USA.
 - Collaboration with Prof. Efthimios Kaxiras within 'Multiscale Mathematical Modeling and Design Realization of Novel 2D Functional Materials' MURI project.
16. July 27–September 10, 2015. Research Visit, Chair of Computational Mathematics and Simulation Science (MCSS), SB MATHICSE, EPF Lausanne, Switzerland.
17. August 10–14, 2015. Summer School 'Computation at Interfaces', Roscoff, France.
18. July 8–14, 2015. Research Visit, with Prof. Eric Cancès, CERMICS, Ecole des Ponts, Noisy-Champs, France.
19. March 17–22, 2014. Research Visit, with Virginie Ehrlacher, CERMICS, Ecole des Ponts, Noisy-Champs, France.
20. August 2013. Summer School and Research Project, CEMRACS '13, Centre International de Rencontres Mathématiques (CIRM), Marseille, France.
 - Joint work with Olivier Zahm on the COMPRESS project proposed by EDF.

———— Honors and Awards for Research

- *Best Poster Prize, Annual Meeting of the French Applied Math Society, SMAI Congress, June 2015.*

Teaching record

Course Number & Title	Sem/Year
At Virginia Tech:	
CMDA 2006: Integrated Quantitative Sciences II	Fall 2022
At the University of Kansas:	
MATH 591: Applied Numerical Linear Algebra	Spring 2022
MATH 581: Numerical Methods	Fall 2021
MATH 782/ EECS 782: Numerical Analysis II	Spring 2021
MATH 781/ EECS 781: Numerical Analysis I	Fall 2020
MATH 882: Advanced Numerical Differential Equations	Spring 2020
MATH 581: Numerical Methods	Fall 2019
MATH 320: Elementary Differential Equations	Spring 2019
MATH 220: Applied Differential Equations	Fall 2018
MATH 220: Applied Differential Equations	Fall 2018
MATH 647: Applied Partial Differential Equations	Spring 2018
MATH 220: Applied Differential Equations	Fall 2017
MATH 220: Applied Differential Equations	Fall 2017
At the University of Minnesota:	
MATH 2373 CSE: Linear Algebra and Differential Equations	Fall 2016
At Université de Lausanne:	
TA: General Mathematics II for Biologists	Spring 2014
At Université Pierre et Marie Curie:	
TA: LM 336: Numerical Methods for ODEs	Spring 2013
TA: Algebra I and Analysis I	Fall 2009-2013

Graduate Advising Record

2021–2022 **Katheryn Beck**, PhD. Advisor

2020–2021 **Mikal Nelson**, *Topological Optimization Using the SIMP Method*, Master's thesis defended successfully with mention "honors" on July 26, 2021, Mathematics, KU

2019–2020 **John Mangles**, *Bloch and Wannier functions for periodic systems*, Master's thesis defended successfully on May 13, 2020, Mathematics, KU

Undergraduate Advising Record

2021–2022 **Drake Clark**, *Simulation of Edge Mode Propagation along Topological Domain Walls*, Ongoing Honors Project, Mathematics, KU

- 2021–2022 **Logan Honeycutt**, *Implementing Tensor Trains with Julia*, Ongoing Reading, Mathematics, KU
- 2019–2020 **Pierce Giffin**, *Examining Edge Modes in Crystal Lattices of Finite Size*, Honors Project defended successfully on May 6, 2020, Mathematics, KU
- 2018 **Jill Vesta**, *Numerical Solution of a Nonlinear S-I-R Epidemic Model*, Undergraduate Independent Study (Co-Advisor with A. Miedlar), Mathematics, KU
- 2014 **Samira Amraoui**, **4th year exchange student from Polytech Nice**, *Undergraduate Semester Project, defended successfully on May 20, 2014*, MATHICSE, EPFL
- 2014 **Jonathan Droxler**, *Semester Project*, Applied Mathematics Master, EPFL

Professional Service

Local and State

- Wrote, graded and proctored exams, Mathematics and Statistics Awareness Month (MSAM) Mathematics Competition for grades 3–12, April 2018, April 2019, Lawrence, KS.
- Representative (with other department faculty), Presentation of City of Lawrence Proclamation of MSAM, City Commission Meeting, April 2, 2020, Lawrence, KS.
- Representative (with other department faculty), Signing of State Proclamation of Mathematics and Statistics Awareness Month by Governor Laura Kelly, Kansas State Capitol, March 29, 2020, Topeka, KS.

Regional

- Featured Speaker, Midwest Mathematics Inclusion and Diversity Workshop, Iowa State University, October 20–21, 2018, Ames, IA, USA.

National

- Co-organizer, 6th Annual Meeting of SIAM Central States Section, October 2-3 2021.
- Panel member, National Science Foundation (NSF), 2018, Arlington, VA, USA.
- Department Representative, Graduate School Fair, Joint Mathematics Meeting (JMM), January 10–13, 2018, San Diego, CA, USA.

International

- Co-organizer (with Matthias Maier, Texas A&M University), Minisymposium on *Frontiers in Material Modeling and Device Simulation: From Nano- to Meso-Scale*, SIAM Conference on Computational Science and Engineering (CSE21), March 1-5, 2021, Virtual Conference, Fort Worth, TX, USA.
- Expert Reviewer for the Research Foundation Flanders (FWO) through the European Science Foundation, 2020.

- Co-Organizer (with Malena I. Espanol, University of Akron), Minisymposium on *Modeling the mechanics of 2D materials*, 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019), July 15–19, 2019, Valencia, Spain.
- Organizer, Minisymposium on *Recent advances in modeling and numerical analysis for electronic structure calculations*, Society for Industrial and Applied Mathematics (SIAM) Conference on Computational Science and Engineering (CSE19), February 25–March 1, 2019, Spokane, WA, USA.
- Chair, Contributed Presentations on Numerical Methods for Statistical Mechanics and Plasmas, SIAM Conference on Computational Science and Engineering 2015 (SIAM CSE15), March 14–18, 2015, Salt Lake City, UT, USA.

Reviewer for Professional Journals

- SIAM Journal of Multiscale Modeling and Simulations (2018,2021,2022)
- SIAM Journal on Scientific Computing (2019)
- SIAM Journal on Numerical Analysis (2022)
- Journal of Computational Physics (2015,2018)
- Journal de Mathématiques Pures et Appliquées (2019, 2020)
- Physical Review Letters (2021)
- Physical Review X (2022)
- Pure and Applied Analysis (2020)
- IMA Journal on Numerical Analysis (2020)
- Engineering Analysis with Boundary Elements (2014)
- Numerische Mathematik (20)

Membership in Scientific Organizations

- Société de Mathématiques Appliquées et Industrielles (SMAI), May 2012 – present,
- Society for Industrial and Applied Mathematics (SIAM), January 2014 – present,
- SIAM Activity Groups on Applied Partial Differential Equations (APDE), March 2014 – present,
- SIAM Activity Group on Mathematical Aspects of Materials Science (MS), March 2014 – present,
- American Mathematical Society (AMS), October 2018 – present.