CURRICULUM VITAE

DAVID MILOVICH

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Employment

- Senior Scientist, Welkin Sciences, 2018–present.
    - Development, analysis, and simulation of scintillated trans-ionospheric communication.
        * Algorithm design for channel simulation with rigorous error bounds.
        * Software development for real-time channel simulation.
            · CUDA C/C++, Julia, GNURadio, NumPy.
        * Physical derivation of improved channel models.
- Texas A&M International University (TAMIU), 2009–2018.
    - Associate Professor of Mathematics, 2015–2018,
    - Assistant Professor of Mathematics, 2009–2015.
    - Teaching: freshman through master's level courses.
    - Publications: set theory, general topology, Boolean algebras.

Education

- Ph.D., Mathematics, University of Wisconsin-Madison, May 2009.
- S.B., Mathematics, Massachusetts Institute of Technology, June 2004.
- S.B., Physics, Massachusetts Institute of Technology, June 2004.

Peer-reviewed publications

- History, physics, and assumptions of the DTRA channel model, *Journal of Radiation Effects: Research and Engineering* **41** (2023), 152–162.
- Team games, hypergraph spaces, and projective Boolean algebras, *Topology and its Applications* **323** (2023), Article 108291.
- Telgarsky's conjecture may fail (with Will Brian, Alan Dow, and Lynne Yengulalp), *Israel Journal of Mathematics* **242** (2021), 325–358.
- Between homeomorphism type and Tukey type, *Topology and its Applications* **271** (2020), Article 106985.
- Non-Absoluteness of Model Existence at $\aleph_\omega$ (with Ioannis Souldatos), *Fundamenta Mathematicae* **243** (2018), 179–193.
- On the strong Freese-Nation property, *Order* **34** (2017), 91–111.
- Review of *Set Theory* by K. Kunen, *Bulletin of Symbolic Logic* **22** (2016), 353–354.
- Noetherian type in topological products (with Menachem Kojman and Santi Spadaro), *Israel Journal of Mathematics* **202** (2014), 195–225.
- Iterated forcing and the Continuum Hypothesis (with Todd Eisworth and Justin Tatch Moore), *Appalachian Set Theory 2006–2012*, London Mathematical Society Lecture Note Series **406**, pp. 207–244, Cambridge University Press, 2013.

- A tutorial on Set Mapping Reflection (with J. T. Moore), *Appalachian Set Theory 2006–2012*, London Mathematical Society Lecture Note Series **406**, pp. 121–144, Cambridge University Press, 2013.
- Forbidden rectangles in compacta, *Topology and its Applications* **159** (2012), 3180–3189.
- The (λ, κ)-Freese-Nation property for boolean algebras and compacta, *Order* **29** (2012), 361–379.
- The topology of ultrafilters as subspaces of 2^ω (with Andrea Medini), *Topology and its Applications* **159** (2012), 1318–1333.
- GO-spaces and Noetherian spectra, *Topology and its Applications* **158** (2011), 2528–2534.
- Power homogeneous compacta and the order theory of local bases (with Guit-Jan Ridderbos), *Topology and its Applications* **158** (2011), no. 3, 432–444.
- On a Theorem of Van Mill, *Topology and its Applications* **156** (2009), no. 15, 2504–2506.
- Splitting families and the Noetherian type of $\beta\omega \setminus \omega$, *Journal of Symbolic Logic* **73** (2008), no. 4, 1289–1306.
- Noetherian types of homogeneous compacta and dyadic compacta, *Topology and its Applications* **156** (2008), 443–464.
- Tukey classes of ultrafilters on ω, *Topology Proceedings* **32** (2008), 351–362.
- Amalgams, connectifications, and homogeneous compacta, *Topology and its Applications* **154** (2007), 1170–1177.

TAMIU Master's Theses supervised

- Edward Estrada, *Destroying tricommutativity of a 3-cube using the symmetric functor.* Successfully defended summer 2018.
- Rene Montemayor, *Breaking the weak commutative property of finite Boolean subalgebra triples.* Successfully defended fall 2016. Rene Montemayor's thesis work was mentioned in my invited Oct. 2017 talk at the Special Conference in Set-Theoretic Topology at Auburn University.
- Jorge L. Guerrero, *An Analogy of "Period Three Implies Chaos" for Simple Dendrites.* Successfully defended fall 2015. Jorge Guerrero presented his thesis work at the Joint Mathematics meetings in January 2015.

Research grants (TAMIU)

- *Real-Time Frequency-Selective Fading Channel Realization Generator* (PI: Milovich), Jan. 2015–Jul. 2016, $42,356, subcontract for Phase II proposal by Welkin Sciences to Defense Threat Reduction Agency.
- *Order invariants in topology*, TAMIU University Research Grant, September 2011–August 2012, $5,765.

Fellowships

- NSF Graduate Student Research Fellowship, September 2004–August 2007.

Awards

- Scholar of the Year, College of Arts and Sciences, TAMIU, 2018.
- Scholar of the Year, Dept. of Mathematics, and Physics, TAMIU in 2018, 2014, and 2011.
- Teacher of the Year, Dept. of Mathematics and Physics, TAMIU, 2015.
- Excellence in Mathematical Research Award, University of Wisconsin Madison Mathematics Department, May 2009.
- Excellence in Teaching Award, University of Wisconsin Madison Mathematics Department, May 2008.
- Rogers Prize, M.I.T. Mathematics Department Summer Program in Undergraduate Research, August 2002.

Teaching

- TAMIU, fall 2009–spring 2018:
    - Graduate mathematics courses
        * Linear Algebra: fall 2017.
        * Probability: fall 2012.
        * Real Analysis: spring 2013, fall 2014.
        * Complex Analysis: spring 2014.
        * Topology: spring 2012, fall 2013, spring 2015, spring 2018.
        * Thesis I: most semesters and summers, 2013–2018.
        * Thesis II: most semesters and summers, 2013–2018.
    - Graduate statistics courses
        * Categorical Data Analysis: spring 2017.
    - Undergraduate mathematics courses
        * General Topology: fall 2010, spring 2015.
        * Real Analysis: every fall 2012 through 2017.
        * Linear Algebra: spring 2016, spring 2017, spring 2018.
        * History of Mathematics: fall 2015.
        * Calculus I: fall 2009, fall 2010.
        * Calculus II: spring 2010, spring 2011, fall 2013, fall 2014, fall 2015.
        * Calculus III: spring 2013, spring 2014, spring 2016, fall 2016, spring 2017, fall 2017, spring 2018.
        * Business Math I: fall 2009, fall 2011.
        * Business Math II (calculus): fall 2011, spring 2016, fall 2016.
    - Undergraduate physics courses
        * University Physics I: spring 2010, spring 2011, spring 2012, spring 2015.
        * University Physics I Lab: fall 2011, spring 2012, spring 2013, spring 2014.
        * University Physics II: fall 2010, fall 2012.
        * University Physics II Lab: fall 2012, fall 2013.
- Teaching Assistant, University of Wisconsin-Madison Mathematics Department, fall 2007–spring 2009:
    - Calculus, led two discussion sections, spring 2009.
    - Linear Algebra and Differential Equations, led four discussion sections, fall 2008.
    - Calculus and Analytic Geometry, led discussion section, summer 2008.
    - Trigonometry, lecturer for three small sections, spring 2008.
    - Calculus and Analytic Geometry, led two discussion sections, fall 2007.
- Instructor, Summer Enhancement Program, University of Wisconsin-Madison Mathematics Department, taught preparation course for the logic qualifying exam to graduate students, summer 2007.

Mentoring

- 3 master's thesis advisees.
- Monthly mentoring of STEM majors for CASC-aid Scholarship Program (about 7 mentees per semester 2016–2018).
- Monthly mentoring of upper-level math majors for Robert Noyce Mathematics Teacher Scholarship Program (about 4 mentees per semester 2014–2018).
- Classroom observations of junior colleagues (about 2 colleagues per semester 2015–2018).

Technology applied to research and teaching (TAMIU)

- Algorithm design and C and Mathematica programming for applied statistics research for Welkin Sciences (2008, 2015).

- IPython/Jupyter programming for teaching demonstrations; installation and adminstration of IPython notebook server (spring 2016–present).
- Online publishing of photographed board work (since fall 2012) and recorded lecture audio (since fall 2015).
- SageMath programming for teaching demonstrations; installation and administration of SageMath server (spring 2014–present).
- Small physics simulation Python programs as a class' final project (fall 2012).
- Mathematica programming for teaching demonstrations (2009–2012).

Service

- Review of submitted journal articles
  - *Transactions of the American Mathematical Society.*
  - *Topology and its Applications.*
  - *Topology Proceedings.*
  - *Archive for Mathematical Logic.*
  - *Annals of Pure and Applied Logic.*
  - *Journal of Symbolic Logic.*
  - *Order.*
- Book reviews
  - Kunen. *Set Theory.* Reviewed in summer 2016 for *Bulletin of Symbolic Logic.*
  - Bradley and Howell (eds.). *Mathematics through the eyes of faith.* 5 chapters reviewed in fall 2010.
- Administrative service
  - Department committees chaired
    * Assessment, fall 2016–spring 2017.
    * Core curriculum, fall 2014–spring 2018.
    * Mathematics curriculum and assessment, fall 2011–spring 2015.
    * Library, fall 2011–spring 2013.
    * Calculus textbook selection, spring 2011.
    * Conferences and colloquia, fall 2010–spring 2011.
    * Mathematics graduate course prequresites, fall 2010.
  - Faculty Senate committees chaired
    * Assessment committee, fall 2017–spring 2018.
  - Other committee membership
    * Faculty senate, fall 2015–spring 2018.
      · Finance committee, fall 2015–spring 2016.
      · Faculty workplace and morale committee, fall 2016–spring 2018.
    * University core curriculum, fall 2014–spring 2018.
    * Library, fall 2009–spring 2015.
    * LBV academic conference, fall 2009–spring 2010.
    * Dept. assessment, fall 2009–spring 2018.
    * Dept. promotion and tenure, fall 2015–spring 2018.
    * Dept. graduate admissions, fall 2013–spring 2015.
    * Dept. faculty search, fall 2011–summer 2013.
    * Dept. curriculum, fall 2009–spring 2013, fall 2017–spring 2018.
    * Dept. conferences and colloquia, fall 2009–spring 2011.
- Math Outreach and Enrichment Talks and Activities
  - *Time dilation*, TAMIU CASCaid scholars lecture, March 3, 2017.
  - *Towers of Hanoi*, Discover TAMIU, Spring 2016, 2017.

- *How the Global Positioning System (GPS) uses general relativity*, TAMIU Mathematics/Physical Science Educator Cohort workshop, May 24, 2010 and May 23, 2011.
- *Simple calculator explorations of chaos*, TAMIU Mathematics/Physical Science Educator Cohort workshop, May 24, 2010 and May 23, 2011.
- *Dodgeball and Diagonalization* (with Firooz Khosraviyani), TAMIU STEM Day, 1/26/2012.
- *Fibonacci Nim* (with Firooz Khosraviyani), TAMIU STEM Day, 2011.
- *Large networks, hidden order, and the game of Sim*, High School Math Night, University of Wisconsin—Madison, 11/19/2008.
- *Ramsey's Theorem via nonstandard numbers*, Undergraduate Mathematics Club, University of Wisconsin—Madison, 11/10/2008.
- *Infinity with rubber bands*, Math Week, Madison East High School, 5/25/2008.
- *Introduction to Ordinals*, Splash (high school level audience), M.I.T. Educational Studies Program, fall 2003.

Professional Affiliations

- Association for Symbolic Logic
- American Mathematical Society
- American Geophysical Union

Professional Consulting while at TAMIU

- Consultant, Welkin Sciences, May 2008–October 2008 and June 2010—July 2010. Designed (and implemented in C) a genetic algorithm for finding better cellular automata to be used as a fast, high-quality pseudorandom number generator in an FPGA device. Successfully used the algorithm to find such a random number generator.

Invited conference talks

- *Pin homogeneity*, Spring Topology and Dynamics Conference, Auburn University, 3/17/2018.
- *What 2^{ω_2} taught me about 2^2*, Special Conference in Set-Theoretic Topology, 10/22/2017, Auburn University.
- *Higher-arity properties of inverse limit systems*, Spring Topology and Dynamics Conference, 3/12/2016, Baylor University.
- *Are all points in homogeneous compacta Tukey maximal?*, Pitt Topology Conference, 5/12/2015, University of Pittsburgh.
- *Topological Applications of long ω_1-approximation sequences*, Winter School in Abstract Analysis, 2/4/2015–2/6/2015, Hejnice, Czech Republic.
- *A locally finite characterization of AE(0) and related classes of compacta*, Spring Topology and Dynamics Conference, 4/13/2014, University of Richmond.
- *A recipe for homogeneous compacta*, American Mathematical Society 2013 spring western sectional meeting, 4/14/2013, University of Colorado—Boulder.
- *Davies trees and their applications*, Young Set Theory Meeting, 5/4/2012, CIRM, Luminy, France.
- *Order types of bases in box products, ω^*, and homogeneous compacta*, Spring Topology and Dynamics Conference, 3/18/2011, University of Texas—Tyler.
- *The (λ, κ)-FN and the order theory of bases in boolean algebras*, BLAST (Boolean algebras, Lattices...), 6/2/2010, University of Colorado—Boulder.
- *Order properties of bases in products*, Spring Topology and Dynamics Conference, 3/20/2010, Mississippi State University.

Contributed conference talks

- *Between Tukey equivalence and Boolean automorphism*, BLAST (Boolean algebras, Lattices...), University of Denver, 8/6/2018.

- *Amalgamating many overlapping Boolean algebras*, ASL Winter Meeting (at Joint Mathematics Meetings), 1/6/2017, Atlanta.
- *Forbidden local bases*, ASL North American Meeting, 3/31/2012, University of Wisconsin—Madison.
- *Box products and singular cardinals*, BLAST (Boolean algebras, Lattices...), 6/1/2011, University of Kansas.
- *Beyond many-player Nim: counterexamples*, South Texas Mathematics Consortium Annual Meeting, 2/20/2010, Texas A&M International University.
- *π-character and the order types of local bases in compacta*, Kunen Fest: Topology and Set Theory Conference, 4/3/2009, University of Wisconsin-Madison.
- *Two spectra of Noetherian types*, Spring Topology and Dynamics Conference, 3/8/2009, University of Florida.
- *Math Night: a university reaching out to high schoolers*, Wisconsin Section Annual MAA Meeting, 4/26/2008, University of Wisconsin—Madison.
- *Applications of ω_1-approximation systems*, Boise Extravaganza in Set Theory, 3/28/2008, Boise State University.
- *Diamond and ultrafilters*, Spring Topology and Dynamics Conference, 3/14/2008, University of Wisconsin—Milwaukee.
- *Noetherian types of ultrafilters on ω*, Graduate Student Conference in Logic, 4/28/2007.
- *Noetherian types of homogeneous compacta*, Spring Topology and Dynamics Conference, 3/30/2007, University of Missouri—Rolla.
- *Tukey classes of local bases in compacta*, Boise Extravaganza in Set Theory, 3/25/2007, Boise State University.
- *Reflecting cones on boolean algebras*, Greater Boston Logic Conference, 5/13/2006, Massachusetts Institute of Technology.
- *Some order weight spectra*, Graduate Student Conference in Logic, 4/29/2006.
- *Branch Products*, Joint Mathematics Meetings, AMS Special Session on Lattice Theory, 1/7/2004, Phoenix.