

# Stanislav M. Mintchev

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## Academic Positions

- SEPTEMBER 2016 – PRESENT: Associate Professor of Mathematics, with tenure  
*Institution:* The Cooper Union for the Advancement of Science and Art, New York, NY.
- SEPTEMBER 2010 – AUGUST 2016: Assistant Professor of Mathematics, tenure-track  
*Institution:* The Cooper Union for the Advancement of Science and Art, New York, NY.
- SEPTEMBER 2008 – AUGUST 2010: Visiting Assistant Professor of Mathematics  
*Institution:* The Cooper Union for the Advancement of Science and Art, New York, NY.

## Education

- SEPTEMBER 2002 – AUGUST 2008: Ph.D. (2008), M.S. (2006), Mathematics.  
*Institution:* Courant Institute of Mathematical Sciences, New York University (NYU).  
*Doctoral Thesis:* Self-Organization Phenomena in Networks of Pulse-Coupled Phase Oscillators.  
*Advisor:* Prof. Lai-Sang Young, Dynamical Systems.
- SEPTEMBER 1998 – MAY 2002: BS Physics, BS Mathematics. Majors with special honors.  
*Institution:* The George Washington University (GWU), Washington, DC.  
*Undergraduate Honors Thesis:* Continued Fraction Expansions and Self-similarity of Irrational Rotations, directed by Prof. E.A. Robinson, Jr.

## Principal Research Interests

- Dynamical Systems and Chaos Theory, Applied Dynamical Systems, Computational Mathematics, Applications to Mathematical Physics, Biology, Neuroscience, Machine Learning, and Pattern Recognition.

## Papers

- PUBLISHED
  1. B. Fernandez and S. M. Mintchev. Wave generation in unidirectional chains of idealized neural oscillators. *Journal of Mathematical Neuroscience* **6:5** (2016).
  2. O. E. Lanford III and S. M. Mintchev. Stability of a family of traveling wave solutions in a feedforward chain of phase oscillators. *Nonlinearity* **28** (2015) 237-261.
  3. S. M. Mintchev and L.-S. Young. Self-organization in predominantly feedforward oscillator chains. *Chaos* **19** (2009) 043131.
- PREPRINTS
  1. B. Ambrosio and S. M. Mintchev. Periodically kicked feedforward chains of simple excitable FitzHugh-Nagumo neurons. *Submitted*.
- CURRENT PROJECTS / IN PREPARATION
  - Existence of stable traveling waves in smooth systems of coupled phase oscillators.
  - Traveling waves and propagation of rhythmic dynamics in excitable extended systems.
  - Stable perfectly-transmitted signals in phase oscillator chains with instantaneous Dirac impulse coupling.
  - The applicability of return-map studies to the global stability analysis of traveling wave solutions in chains of neural oscillators.

**Talks & Oral** • FALL 2018

**Presentations**

SEPTEMBER 29, 2018: Periodically kicked feedforward chains of simple excitable FitzHugh-Nagumo neurons (Special Session on Stochastic Processes in Mathematical Biology – Fall Eastern Sectional Meeting of the American Mathematical Society, University of Delaware, Newark, DE).

• SPRING 2018

APRIL 6, 2018 (INVITED): A friendly introduction to slow-fast systems and their importance in mathematical neuroscience (Pi Mu Epsilon Mathematics Honor Society Lecture Series – Department of Mathematics, The George Washington University, Washington, DC).

APRIL 6, 2018: Signal transmission properties of unidirectional chains of phase oscillators (Applied Math Seminar – Department of Mathematics, The George Washington University, Washington, DC).

• SPRING 2017

MAY 22, 2017: Generation of stable traveling waves in unidirectional chains of idealized neural oscillators (MS73 at SIAM DS17, Snowbird, UT).

• SUMMER 2016

JUNE 16, 2016: Wave generation in unidirectional chains of idealized neural oscillators (Workshop Modélisation – LPMA, Université Paris 7 Denis Diderot, Paris, FR).

• SPRING 2016

MAY 20, 2016: Robust traveling waves in chains of simple neural oscillators (BAMM! 2016 – VCU, Richmond, VA).

• SUMMER 2015

JUNE 9, 2015: Rigorous results on robust traveling waves in periodically-forced chains of simple type-I oscillators (1<sup>st</sup> ICMNS – Antibes, FR).

• SPRING 2015

APRIL 23, 2015: Existence and stability of traveling wave solutions in a non-monotone feedforward chain of phase oscillators (NYU – Courant Institute).

• SUMMER 2013

JUNE 26 – AUGUST 1, 2013: Geometric singular perturbation theory – parts I,II, and III (NYU – Courant Institute).

• FALL 2012

NOVEMBER 7, 2012: Stability of a family of traveling wave solutions in a feedforward chain of phase oscillators (NYU – Courant Institute).

**Poster**

• SPRING 2014

**Presentations**

MARCH 10, 2014: Generation and stability of traveling wave solutions in unidirectional chains of phase oscillators (University of Pittsburgh).

**Extended  
Research  
Visits**

• LABORATOIRE DE PROBABILITÉS, STATISTIQUE ET MODÉLISATION (LPSM)

CNRS – UNIVERSITÉ PARIS 7 DENIS DIDEROT, PARIS, FR

JUNE, 2018: Project on Oscillator Dynamics (visiting Bastien Fernandez).

MARCH, 2018: Project on Oscillator Dynamics (visiting Bastien Fernandez; sabbatical leave).

JUNE, 2016: Project on Oscillator Dynamics (visiting Bastien Fernandez).

JUNE, 2015: Project on Oscillator Dynamics (visiting Bastien Fernandez).

- CENTRE DE PHYSIQUE THÉORIQUE,  
CNRS – AIX-MARSEILLE UNIVERSITÉ, CAMPUS DE LUMINY CASE, MARSEILLE, FR
- JUNE/JULY, 2012: Project on Oscillator Dynamics (visiting Bastien Fernandez).

**Meetings  
Attended**

- SEPTEMBER 29-30, 2018: *AMS Fall Eastern Sectional Meeting (Meeting # 1141)*, University of Delaware, Newark, DE.
- MAY 21–25, 2017: *SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT.
- MAY 18–20, 2017: *Biology and Medicine Through Mathematics (BAMM! 2017)*, Virginia Commonwealth University, Richmond, VA.
- MAY 20–22, 2016: *Biology and Medicine Through Mathematics (BAMM! 2016)*, Virginia Commonwealth University, Richmond, VA.
- JUNE 8–10, 2015: *1<sup>st</sup> International Conference on Mathematical Neuroscience*, INRIA – Nice, Antibes, FR.
- MARCH 10–12, 2014: *Nonlinear Dynamics and Stochastic Methods: From Neuroscience to Other Biological Applications*, University of Pittsburgh, Pittsburgh, PA.
- MAY 22–26, 2011: *SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT.
- JANUARY 14–15, 2010: *Mini-Conference on Dynamical Systems*, Princeton University, Princeton, NJ.
- MAY 17–21, 2009: *SIAM Conference on Applications of Dynamical Systems*, Snowbird, UT.
- APRIL 24–25, 2009: *Nonlinear Dynamics and Chaos Workshop 2009*, Courant Institute (NYU), New York, NY.
- JANUARY 22–26, 2007: *Introductory Workshop on Dynamical Systems with Emphasis on Extended Systems*, Mathematical Sciences Research Institute (MSRI), Berkeley, CA.
- OCTOBER 6–8, 2006: *Dynamics Days at the Courant Institute—7th Workshop on Nonlinear Dynamics and Chaos*, New York, NY.
- JUNE 27–JULY 10, 2005: *Resonances and Periodic Orbits—Spectrum and Zeta Functions in Quantum and Classical Chaos*, Centre Emile Borel, Institut Henri Poincaré, Paris, FR.
- OCTOBER 1–3, 2004: *Dynamics Days at CIMS—6th Workshop on Nonlinear Dynamics and Chaos*, New York, NY.
- MAY 17, 2002: *Knots in Washington XIV*, Washington, DC.
- MARCH 20–26, 1999: *American Physical Society Centennial Meeting*, Atlanta, GA.

**Research  
Service**

- 2015 – PRESENT: Referee for *Mathematical Reviews*, American Mathematical Society.
- 2011 – PRESENT: Journal Referee for *Chaos, An Interdisciplinary Journal of Nonlinear Science*. American Institute of Physics.

**Prepared to  
Teach**

- Ordinary and Partial Differential Equations, Numerical Analysis and Scientific Computing, Linear Algebra, Introductory and Vector Calculus, Probability, Discrete Mathematics, Topology, Advanced Calculus, Real and Complex Analysis, Abstract Algebra.

**Teaching  
Experience**

- THE COOPER UNION (AS ASSOCIATE PROFESSOR)  
**Boldface = regular course; italicised = independent study / tutorial.**  
  
FALL 2018: **Linear Algebra, Calculus I, Introduction to Linear Algebra, Point-set Topology.**  
SPRING 2018: – on sabbatical leave –  
FALL 2017: **Linear Algebra, Calculus I, Introduction to Linear Algebra, Numerical Analysis.**  
SPRING 2017: **Calculus II, Differential Equations, Mathematical Statistics.**  
FALL 2016: **Linear Algebra, Calculus I, Introduction to Linear Algebra, Mathematical Statistics.**
- THE COOPER UNION (AS ASSISTANT PROFESSOR)  
SPRING 2016: **Calculus II, Differential Equations, Research Problem in Delay Equations in Mathematical Neuroscience.**  
FALL 2015: **Linear Algebra, Calculus I, Introduction to Linear Algebra, Point-set Topology.**  
SPRING 2015: **Calculus II, Differential Equations, Algebraic Topology.**  
FALL 2014: **Linear Algebra, Calculus I, Introduction to Linear Algebra, Point-set Topology.**  
SPRING 2014: **Calculus II, Probability, Algebraic Topology.**  
FALL 2013: **Linear Algebra, Calculus I, Introduction to Linear Algebra, Point-set Topology.**  
SPRING 2013: **Numerical Analysis (graduate), Differential Equations, Dynamical Systems and Chaos.**  
FALL 2012: **Linear Algebra, Calculus I, Introduction to Linear Algebra.**  
SPRING 2012: **Linear Algebra, Differential Equations.**  
FALL 2011: **Calculus I, Introduction to Linear Algebra, Probability.**  
SPRING 2011: **Calculus II, Algebraic Topology.**  
FALL 2010: **Calculus I, Introduction to Linear Algebra, Differential Equations, Point-set Topology.**
- THE COOPER UNION (AS VISITING ASSISTANT PROFESSOR)  
SPRING 2010: **Calculus II, Vector Calculus.**  
FALL 2009: **Calculus I, Introduction to Linear Algebra.**  
SPRING 2009: **Vector Calculus, Differential Equations.**  
FALL 2008: **Calculus I, Introduction to Linear Algebra.**
- THE COOPER UNION (AS ADJUNCT ASSISTANT PROFESSOR, WHILE ABD AT NYU COURANT)  
SPRING 2008: **Calculus I.**
- NEW YORK UNIVERSITY (COURSE INSTRUCTOR AND TEACHING ASSISTANT)  
FALL 2007 AND SPRING 2008: Course Instructor, **Algebra and Calculus (Precalculus).** Lecture with enrollment of 120 students; management of 3 teaching assistants.  
SUMMER 2007: Course Instructor, **Calculus I.**

SPRING 2007: Calculus Placement Test Design. Design of a multiple-choice based placement test, to be given to entering undergraduates wishing to enroll into the introductory calculus sequence.

FALL 2006: Course Instructor, **Linear Algebra**.

SPRING 2006 AND FALL 2005: Course Instructor, **Calculus III**.

SPRING 2005: Course Instructor, **Calculus II**.

FALL 2004: Teaching Assistant, **Ordinary Differential Equations**.

FALL 2003, SPRING 2003, AND FALL 2002: Teaching Assistant, **Calculus for Social and Management Sciences**.

- GEORGE WASHINGTON UNIVERSITY (TEACHING ASSISTANT)  
SPRING 2002: **Calculus for Social and Management Sciences**.

**Student  
Advising**

- THE COOPER UNION  
FALL 2013: *Cooper Team Coach*, 74<sup>th</sup> William Lowell Putnam Mathematical Competition (substituting for R. Smyth); team placed 42<sup>nd</sup> out of 430 competing teams.

**Curriculum  
and Program  
Development**

- THE COOPER UNION  
SPRING 2014 – PRESENT: Curriculum research, undergraduate programs in Mathematics.  
SPRING 2013: Numerical Analysis (graduate).  
SUMMER 2011 – SUMMER 2014: Design and oversight of calculus placement examination.  
FALL 2010 – SPRING 2011: Review and selection of textbook for calculus sequence.

**Assessment  
Work**

- THE COOPER UNION  
SPRING 2013: Draft of Departmental Interim Report for Middle States Commission on Higher Education (collaboration with O. Agrawal).  
SPRING 2012: Standardization/Composition of Drafts of the Departmental Syllabi for the Department of Mathematics, in preparation for the Fall 2012 ABET accreditation visit.  
SPRING 2012: Design of Alumni Questionnaire regarding the Department of Mathematics (collaboration with G. del Cerro Santamaría).  
FALL 2010 – SPRING 2011: Development and Draft of Student Learning Outcomes document for the Mathematics Program.

**Institutional  
Service  
Activities at  
Cooper  
Union**

- FACULTY-STUDENT SENATE  
SEPTEMBER 2016 – SEPTEMBER 2017: Senate Chair.  
OCTOBER 2012 – SEPTEMBER 2014; OCTOBER 2015 – SEPTEMBER 2016: Senate Secretary.  
SEPTEMBER 2012 – SEPTEMBER 2017: Representative of the Faculty of the School of Engineering.  
MAY 2011 – AUGUST 2012: Alternate Representative, School of Engineering.
- FACULTY OF THE HUMANITIES AND SOCIAL SCIENCES  
FEBRUARY 2012 – DECEMBER 2016: Representative of the Faculty of the School of Engineering.

**Outreach  
Service**

- 2011 – 2012: *Judge*, NY Area Math Fair (held at Brooklyn Technical High School in March of each year).
- 2008 – 2009: *Organizer*, cSplash - committees on advertising and academic planning (see <http://www.csplash.org>).

**Professional  
Affiliations**

- CURRENT MEMBER: American Mathematical Society (AMS), Mathematical Association of America (MAA), Society for Industrial and Applied Mathematics (SIAM).

**Fellowships  
and Awards**

- SEPTEMBER 2002 – AUGUST 2008: McCracken Doctoral Fellowship (NYU).
- SEPTEMBER 2002 – AUGUST 2005: VIGRE Fellowship (NSF).
- MAY 2002: Marvin Green Prize (GWU).
- MAY 2001: Ruggles Prize (GWU).
- SEPTEMBER 1998 – MAY 2002: Presidential Science Scholarship (GWU).