Minchul Kang
Texas A&M University - Commerce, Department of Mathematics, B303 Binnion Hall, Commerce, TX 75429, USA. ☎: (903) 468-8660

Curriculum Vitae

Contact Information

Minchul Kang
Texas A&M University-Commerce ☎ : (903) 468-8660
Department of Mathematics FAX : (903) 886-5945
B303 Binnion Hall : Minchul.Kang@tamuc.edu
Commerce, TX 75429 : https://www.researchgate.net/profile/Minchul_Kang/

Education

Ph.D., Mathematics **2005**
The University of Minnesota, Twin Cities, MN, USA
- Minor in Computational Neuroscience
- Adviser: Prof. Hans G. Othmer

M.S., Mathematics **2001**
The University of Minnesota, Twin Cities, MN, USA
- Minor in Computational Neuroscience
- Adviser: Prof. Hans G. Othmer

B.S., Mathematics (*Summa cum laude*) **1997**
Korea University, Seoul, Korea
- Minor in Mathematics Education

Positions Held

Assitant Professor **2016 – **
Texas A&M University – Commerce, Commerce, TX, USA
Department of Mathematics

Assitant Professor **2012 – 2016**
St. Thomas University, Miami Gardens, FL, USA
School of Science, Technology & Engineering Management

Postdoctoral Research Fellow **2008 – 2012**
Vanderbilt School of Medicine, Nashville, TN, USA
Department of Molecular Physiology and Biophysics
- Adviser: Prof. Anne K. Kenworthy

Postdoctoral Research Professor **2005 – 2008**
Vanderbilt University, Nashville, TN, USA
Department of Mathematics
- Adviser: Prof. Emmanuele DiBenedetto

Research Assistant/Teaching Assistant **1998 – 2005**
The University of Minnesota, Twin Cities, MN, USA
- Adviser: Prof. Hans G. Othmer

Fellowships and Honors Held

- **Undergraduate research mentoring award** **2014**
  St. Thomas University
- **Academic Affairs Transformational Leadership Award** **2013**
  St. Thomas University
- **Marquis Who's Who in Medicine and Healthcare** **2011**
  Selected for a biographical entry
- **Department of MPB Postdoctoral Fellowship** **2008 – 2012**
  Vanderbilt School of Medicine University
- **Department of Mathematics Postdoctoral Fellowship** **2005 – 2008**
  Vanderbilt University
- **Teaching/Research Assistantship** **1998 – 2005**
  University of Minnesota
- **Asan Foundation Fellowship** **1996 – 1998**
- **Korea University Honors Student Scholarship** **1994 – 1996**

Certificate/ License

Teaching License & Certification (from South Korea) **1997**

- Middle and High School Math Curriculum (K-12 secondary math education)

Teaching Experience

Texas A&M University, Commerce, Commerce, TX, USA **2016 –**

- **Summer Semester 2018**
  - MATH 331 001 Discrete Mathematics
  - MATH 589 001: Applied mathematics and Practice
- **Fall Semester 2018**
  - MATH 2414 Calculus II
  - MATH 2415 Calculus III
  - MATH 2320 Differential Equations
  - MATH 518 Thesis
- **Spring Semester 2018**
  - MATH 2413 Calculus I
  - MATH 335 Linear Algebra
  - MATH 437 Elementary Number Theory

- MATH 518 Thesis

◦ **Fall Semester 2017**

- MATH 315 Differential Equations
- MATH 334 Intro Abstract Algebra
- MATH 453 Essentials of Statistics
- MATH 489 Introduction to PDE
- MATH 518 Thesis

◦ **Spring Semester 2017**

- MATH 192 Calculus II
- MATH 314 Calculus III

◦ **Fall Semester 2016**

- MATH 314 Calculus III
- MATH 331 Discrete Mathematics
- MATH 334 Intro Abstract Algebra

St. Thomas University, Miami Gardens, FL, USA **2012 – 2016**

◦ **Spring Semester 2016**

- MAC 1141. Precalculus
- MAC 2312. Calculus II
- MAD 2104. Discrete Mathematics
- MAT 502. Statistical Methods (HotChalk Online Graduate course)

◦ **Fall Semester 2015**

- MAC 1140. Precalculus
- MAC 2311. Calculus I
- MAT 311. Linear ALgebra
- MAT 502. Statistical Methods (Graduate course)

◦ **Spring Semester 2015**

- MAC 1141. Precalculus
- MAC 2312. Calculus II
- MAT 215. Discrete Mathematics

- **Fall Semester 2014**
  - MAC 2311. Calculus I
  - MAT 410. Introduction to Mathematical Modeling
- **Spring Semester 2014**
  - MAT 182. Precalculus
  - MAT 233. Calculus II
  - MAT 215. Discrete Mathematics
- **Fall Semester 2013**
  - MAT 181. Precalculus
  - MAT 232. Calculus I
  - MAT 205. Applied Statistics
- **Spring Semester 2013**
  - MAT 306. Differential Equations
  - MAT 233. Calculus II
  - MAT 215. Discrete Mathematics
  - MAT 205. Applied Statistics
- **Fall Semester 2012**
  - MAT 410. Introduction to Mathematical Modeling
  - MAT 234. Calculus III
  - MAT 232. Calculus I

The University of Minnesota, Twin Cities, MN, USA **1998 – 2005**

- Teaching Assistant
  - College Algebra, Precalculus, Calculus I, II and III,
  - Differential Equation and Linear Algebra

Program and course developement

Program Developed

St. Thomas University, Miami Gardens, FL, USA **2012 – 2016**

- **MS in applied mathematics** **2015 – 2016**
  - Approved by SACS (Southern Association of Colleges and Schools)
- **Adoption of WeBWork by MAA** **2015 – 2016**
  - Piloted in spring 2015
  - Full adoptation in Fall 2015 (www.webwork.stu.edu)

Course Developed

Texas A&M University, **Commerce**, Commerce, TX, USA **2017 –**

- Introduction to Partial Differential Equations
- Applied Mathematics

St. Thomas University, Miami Gardens, FL, USA **2012 – 2016**

- MAP 5407 Introduction to Applied Mathematics
- STA 5701 Statistical Methods
- MAP 6489 Computational Neuroscience
- MAP 6486 Nonlinear Dynamics in Physiology and Medicine
- MAP 6477 Methods of System Biology and Complexity

Mentoring Experience

Texas A&M University, **Commerce**, Commerce, TX, USA **2017 –**

- Student Competition Using Differential Equation Modeling (SCUDEM) Coach **2018 –**
  - Noel Baeza, Linh Trong, Elyce Burdett
  - Outstanding Award (2018)
- Calculus Ball Coach **2017**
  - 3rd place in 97th Annual Meeting of the Texas Section of the MAA

St. Thomas University, Miami Gardens, FL, USA **2012 – 2016**

- Math club mentor (2015–2016)
- MS Program in Mathematics Coordinator (2015–2016)
- BS Program in Mathematics Coordinator (2012–2016)
- Title V program mentor (2012-2013)
- Summer Research Institute (Undergraduate Research Program)

Vanderbilt University, Nashville, TN, USA **2008 – 2012**

- Vanderbilt Summer Science Academy undergraduate research mentor

Students Mentored

Texas A&M University, **Commerce**, Commerce, TX, USA **2017** –

- **Graduate students**

1. Natasha Astudillo (2017-)
2. Jedidah Koomson **2016** – **2018**
   - First Place Research Award in Graduate Science and Engineering at 2018 Texas A&M University-Commerce Annual Research Symposium

- Undergraduate students

1. Noel Baeza, Linh Trong, Elyce Burdett
   - Outstanding Award in Student Competition Using Differential Equation Modeling (SCUDEM) (2018)

St. Thomas University, Miami Gardens, FL, USA **2012** – **2016**

- Natasha Astudillo **2014** – **2016**
  - Adelante's National Leadership Institute Scholarship
- Anderson Mai **2013** – **2015**
  - 2014 best presentation award in physical sciences
  - Florida International University Engineering Program
- Manuel Andreani **2012** – **2014**
  - Columbia University Graduate School

Service

Texas A&M University, **Commerce**, Commerce, TX, USA

- Department of Mathematics Colloquium Coordinator (2016 –)
- Department of Mathematics, Curriculum Committee (2016 –)

St. Thomas University, Miami Gardens, FL, USA

- Mathematics MS Program coordinator (2015 –2016)
- Mathematics BS Program coordinator (2012 –2016)
- Webwork Course Administrator (2015 –2016)
- Norbert Wiener Mathematics Contest Organizing Chair (2013–2016)
- Pre-med and Pre-Professional Committee (2013–2016)
- Student relations committee (2015)
- Chair of a search committee for an assistant professor of Mathematics (2014)
- Compensation and Welfare Committee (2014)

- School of Science Safety Committee (2013)
- Search committee for an assistant professor of Chemistry (2013)
- Search committee for a Laboratory Director/ Safty Officer (2012)

Comunity Outreach

- Hispanic Association of Colleges and Universities (HACU) Youth Leadership Development Forum (2015)
- Norbert Wiener Mathematics Contest Organizing Chair (2013–2016)
- Miami Garden high school research fair judge (2012)
- Presentations about exciting careers in mathematics for local high school students (2012–2016)

Journal Reviewer for:

- Bioinformatics
- Biophysical Journal
- Bulletin of Mathematical Biology
- Cancer Research
- Chaos
- Journal of Mathematical Biology
- Physical Biology
- Plos One

Research Experience & Interests

1. **Mathematical/Computational/Systems Biology**
   (a) Data Driven Mathematical Modeling
   (b) Cell Signaling Network Analysis
2. **Applied Mathematics**
   (a) Reaction diffusion System
   (b) Nonlinear Dynamical System
   (c) Numerical analysis, simulation
   (d) Parameter estimation, Optimization
3. **Biophysics**
   (a) Binding/Diffusion processes in biological systems
   (b) Anomalous diffusion
   (c) Theoretical fluorescence microscopy

Grants and Funding

1. **Travel Grant**
   - St Thomas University travel grant (2014)
   - University of Massachusetts Medical School (2012)
   - H Lee Moffitt Cancer Center & Research Institute (2011)
   - University of Nottingham, UK (2010)
2. NSF 18-058 Dear Colleague Letter: Growing Convergence Research (Submitted)
3. NIH R15 Grant. Linear regression analysis on FRAP and FCS for in situ real time calibration of time dependent diffusion coefficients and its application to anomalous diffusion processes on cell membranes (In preparation).

Publications

Research Articles

1. Minchul Kang, Manuel Andreani, and Anne Kenworthy. (2015) Normalizations, scaling, and photofading corrections for FRAP data analysis and their implications. PLoS ONE 10(5):e0127966.
2. Minchul Kang, Charles Day, Anne Kenworthy, and Emmanuele DiBenedetto. (2012) Simplified equation to extract diffusion coefficients from confocal FRAP data. Traffic. 13(12):1589–1600.
3. Charles Day, Lewis Kraft, Minchul Kang, and Anne Kenworthy. (2012) Analysis of protein and lipid dynamics using confocal fluorescence recovery after photobleaching. Curr Protoc Cytom. Chapter 2:Unit2.19.
4. Daniel Chinnapen, Ramiro Massol, Wan-Ting Hsieh, Yvonne Welscher, David Saslowsky, Lydia Kaoutzani, Eelke Brandsma, Hyejung Park, Jessica Wagner, Kimberly Drake, Minchul Kang, Thomas Benjamin, David Ullman, Cathy Costello, Anne Kenworthy, Tobias Baumgart, and Wayne Lencer. (2012) A native lipid-sorting pathway from PM to ER for the unsaturated species of ganglioside GM1 Dev Cell. 23(3):573-86.
5. Maria Kiskowski, Roger Jackson, Xiaohong Li, Minchul Kang, Simin Hayward and Neil Bhowmick. (2011) Role for Stromal Hetrogeneity in Prostate Tumorigenesis. Cancer Res., 71(10):3459-3470
6. Minchul Kang, Emmanuele DiBenedetto, and Anne Kenworthy. (2011) Proposed Correction to Feder's Anomalous Diffusion FRAP Equations. Biophys J., 100(3): 791-792
7. Minchul Kang, Charles Day, Kimberly Drake, Anne Kenworthy, and Emmanuele DiBenedetto. (2010) A quantitative approach to analyze binding diffusion kinetics by confocal FRAP. Biophys J., 99(9): 2737–2747
8. Kimberly Drake, Minchul Kang, and Anne Kenworthy (2010) Nucleocytoplasmic distribution and dynamics of the autophagosome marker EGFP-LC3. PLoS ONE 5(3): e9806.
9. Minchul Kang, and Anne Kenworthy (2009) Complex Applications of Simple FRAP on Membranes., in Biomembrane Frontiers, R. Faller et. al. editors, Humana Press, New York, USA
10. Minchul Kang and Hans Othmer (2009) Spatiotemporal characteristics of calcium dynamics in astrocytes. Chaos, 19:037116.
11. Minchul Kang, Charles Day, Kimberly Drake, Anne Kenworthy, and Emmanuele DiBenedetto. (2009) A generalization of theory for two-dimensional fluorescence recovery after photobleaching applicable to confocal laser scanning microscopes., Biophys J., 97(5):1501-11.
12. Minchul Kang and Anne Kenworthy (2008) A closed-form analytic expression for FRAP formula for the binding diffusion model., Biophys J., 95(2):L13-5.
13. Minchul Kang and Hans Othmer (2007) The variety of cytosolic calcium responses and possible roles of PLC and PKC., Phys Biol, 4: 325-343.

Thesis

Temporal and Spatial Aspects of Calcium Dynamics in Astrocytes. (Ph. D. Thesis, The University of Minnesota)

In Preparation

Book

- Introduction to mathematical theory of FRAP and FCS.
- Calculus : Story of the Limits

INVITED LECTURES, POSTER PRESENTATION AND SEMINARS

1. Biophysical Society Annual Meeting 2018, poster presentation, Febuary 2018
   - A Novel Computational Framework for D(t) from FRAP Data Reveals Various Anomalous Diffusion Types
2. MAA 2017 TX Conference, invited speaker, March 2017
   - Direct $D(t)$ computation from FRAP data reveals various anomalous diffusion types
3. SIAM: SIAM Conference on the Life Sciences, Boston, USA, invited speaker, July 2016
   - Linear regression analysis of FRAP to investigate anomalous diffusion on cell membranes
4. California State University Fresno, Department of Mathematics, Applied Mathematics seminar, invited speaker, March 2016
   - Validation of Normalizations, Scaling, and Photofading Corrections for FRAP Data Analysis.
5. University of Minnesota, Duluth. Department of Mathematics, Applied Mathematics seminar, invited speaker, Febraury 2016
   - Simplified equation to extract diffusion coefficients from confocal FRAP data.
6. Computational Methods and Modeling of Astrocyte Physiology and Neuron-Glia Interactions workshop,Quebeck City, Canada, invited speaker, July 2014
   - Calcium dynamics in astrocyte networks of CNS
7. North Carolina A&T State University, Department of Mathematics, Applied Mathematics seminar, invited speaker, April 2012
   - Analysis of protein and lipid dynamics using confocal fluorescence recovery after photobleaching
8. Kyung-Hee University, Department of Mathematics, Applied Mathematics seminar, invited speaker, April 2012
   - Complex Applications of Simple FRAP on Membranes
9. West Viginia Univeristy, Department of Mathematics, Applied Mathematics seminar, invited speaker, March 2012
   - Mathematical modeling of fluorescence microscopy and its applications to cancer systems biology
10. Wichita State University, Department of Mathematics, Applied Mathematics seminar, invited speaker, March 2012

- Reaction diffusion model of fluorescence microscopy and its applications

11. Embry-Riddle Aeronautical University, Department of Mathematics, Applied Mathematics seminar, invited speaker, Febraury 2012
    - A closed-form analytic expression for FRAP formula for the binding diffusion model.
12. University of Massachusetts Medical School, Department of Microbiology and Physiological Systems, Systems Biology Seminar, invited speaker, July 2011
    - Systems biology approach to Cancer: Mathematical and experimental aspects
13. Northern Illinois University, Department of Mathematics, Mathematical biology seminar, invited speaker, March 2011
    - A quantitative approach to analyze binding diffusion kinetics by confocal FRAP
14. H Lee Moffitt Cancer Center & Research Institute, Integrative mathematical oncology seminar, invited speaker, November, 2010
    - HRas trafficking and binding kinetics: A mathematical approach.
15. Systems biology of GPCR signaling, Nottingham, UK, invited speaker, September, 2010
    - The variety of cytosolic calcium responses and possible roles of PLC and PKC
16. Vanderbilt University Department of Molecular Physiology and Biophysics Departmental Seminar, September, 2008
    - Complex Applications of Simple FRAP on Membranes
17. Biophysical Society Annual Meeting 2007, invited speaker, March 2007
    - A quantitative approach to analyze binding diffusion kinetics by confocal FRAP
18. Vanderbilt University Mathematical Biology seminar, invited speaker, February 2004
    - Feedback mechnisms of PLC and PKC in astrocytic calcium dynamics.
19. MBI Workshops 2003-2004 (Ohio State University), invited speaker, January 2004
    - Spatiotemporal characteristics of calcium dynamics in astrocytes
20. School of Mathematics (University of Minnesota) Mathematical Biology seminar, September, 2003
    - Pi theorem, nondimensionalization, and scaling for a large system of differential equations.
21. School of Mathematics (University of Minnesota) Mathematical Biology seminar, May, 2001
    - Bifurcation structure and feedback mechanisms in calcium dynamics

Career development

- SIMIODE Model INstructors in Differential Equations (MINDE) Workshop. Manhantan College (July 2018)

Professional Memberships

- American Mathematical Society
- Biophysical Society

Technical Skills

Programming Languages

- Matlab, Mathematica, C/C++, Java, LaTex, XPPAUT, AUTO, ImageJ, Comsol

Lab Skills

- Laser Scanning Confocal Microscope (Model 510; Carl Zeiss MicroImaging, Inc., Thornwood, NY).

Educational Softwares

- Blackboard, Webadvisor, Webwork

In the press

- Texas A&M University Commerce Pride Online. Apr 12, 2017. "Calculus Team Wins Third Place"