CURRICULUM VITAE: DIONISIOS MARGETIS

1. PERSONAL INFORMATION (Homepage: http://www.math.umd.edu/∼dio)

Office: *2106 Math. Bldg., University of Maryland, College Park, MD 20742, U.S.A.*
Phone: 301 405 5455; email: dio@math.umd.edu

Tenure appointment: Department of Mathematics

Joint appointment: Institute for Physical Science & Technology (IPST)

Faculty Affiliation: Center for Scientific Computation & Mathematical Modeling (CSCAMM)

Faculty Membership: Maryland NanoCenter

Country of citizenship: Greece

a. Educational background

Degree	Date Awarded	Institution
Electrical Eng. Diploma	11/1992	National Technical Univ. of Athens (NTUA), Greece
S. M., Applied Physics	06/1994	Harvard University
Ph. D., Applied Physics	06/1999	Harvard University

b. Employment background

Institution	Rank	Dates
University of Maryland, College Park	Full Professor of Mathematics (tenured)	07/2012 - present
	Associate Professor of Mathematics (tenured)	07/2009 - 06/2012
	Assistant Professor of Mathematics	07/2006 - 06/2009
Massachusetts Inst. of Technology (M.I.T.)	Lecturer of Applied Math.	07/2004 - 06/2006
	Instructor of Applied Math.	01/2002 - 06/2004
Harvard University	Lecturer on Applied Math.	09/2001 - 12/2001
	Postdoctoral Fellow: Applied Physics	07/1999 - 08/2001

c. Visiting Positions

• Visiting Professor: Institut Lumière Matière, Université Claude Bernard Lyon 1, Villeurbanne, France, May 12-June 6 2014.
• Invited Participant: Institute for Pure and Applied Mathematics (IPAM), University of California, Los Angeles, Nov. 10-Dec. 8 2012.
• Invited Visitor: Theory Department, Fritz Haber Institute of the Max Planck Society, Berlin, Germany, Jan. 10-24, 2008.

d. Research Interests

• Mathematical Modeling and Applied Analysis; Asymptotics for PDEs.
• Mathematical Aspects of Materials Science: Epitaxial Growth; Interface Motion Laws.
• Non-Equilibrium Statistical Mechanics.
• Quantum Dynamics: Bose-Einstein Condensation, Quantum Computing, Density Functional Theories.
• Electromagnetic Wave Propagation near Boundaries; Surface Plasmonics; Optical Antenna Theory.
• Quantum Field Theories.

2. RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

a. Books

i. Books authored

ii. Books edited

iii. Chapters in Books

1. H. A. Stone and D. Margetis, *Continuum Descriptions of Crystal Surface Evolution*, Handbook of Materials Modeling, Vol. I (2005), pp. 1389–1401, S. Yip (Editor), Springer Verlag.

b. Articles in Refereed Journals

Articles are available online at: www.math.umd.edu/∼dio/publications.html
1. D. Margetis, *Pulse propagation in sea water*, J. Appl. Phys., Vol. 77 (1995), pp. 2884–2888.

2. D. Margetis and R. W. P. King, *Comments on "Propagation of EM pulses excited by an electric dipole in a conducting medium"*, IEEE Trans. Antennas Propagat., Vol. 43 (1995), pp. 119–120.

3. J. D. Kanellopoulos and D. Margetis, *A predictive analysis of differential attenuation on adjacent satellite paths including rain height effects*, European Trans. Telecommunications, Vol. 8 (1997), pp. 141–148.

4. D. Margetis, G. Fikioris, J. M. Myers, and T. T. Wu, *Highly directive current distributions: General theory*, Phys. Rev. E, Vol. 58 (1998), pp. 2531–2547.

5. D. Margetis, *Electromagnetic fields in air of traveling-wave currents above the earth*, J. Math. Phys., Vol. 39 (1998), pp. 5870–5893.

6. D. Margetis, *Bose-Einstein condensation in an external potential at zero temperature: Solitary wave theory*, J. Math. Phys., Vol. 40 (1999), pp. 5522–5543.

7. D. Margetis, *Pulse propagation in sea water: The modulated pulse*, Progress in Electromagnetics Research (PIER), Vol. 26 (2000), pp. 89–110.

8. D. Margetis, *Asymptotic formula for the condensate wave function of a trapped Bose gas*, Phys. Rev. A, Vol. 61 (2000), 055601 (2pp).

9. D. Margetis and G. Fikioris, *Two-dimensional highly directive currents on large circular loops*, J. Math. Phys., Vol. 41 (2000), pp. 6130–6172.

10. D. Margetis and T. T. Wu, *Exactly calculable field components of electric dipoles in planar boundary*, J. Math. Phys., Vol. 42 (2001), pp. 713–745.

11. D. Margetis, *Radiation of horizontal electric dipole on large dielectric sphere*, J. Math. Phys., Vol. 43 (2002), pp. 3162–3201.

12. R. W. P. King and D. Margetis, *The low-frequency electric fields induced in a spherical cell including its nucleus*, Progress in Electromagnetics Research (PIER), Vol. 36 (2002), pp. 61–79.

13. D. Margetis, E. Kaxiras, M. Elstner, Th. Frauenheim, and M. R. Manaa, *Electronic structure of solid nitromethane: Effects of high pressure and molecular vacancies*, J. Chem. Phys., Vol. 117 (2002), pp. 788–799.

14. D. Margetis, M. J. Aziz, and H. A. Stone, *Continuum description of profile scaling in nanostructure decay*, Phys. Rev. B, Vol. 69 (2004), 041404(R) (4pp).

15. D. Margetis, M. J. Aziz, and H. A. Stone, *Continuum approach to self-similarity and scaling in morphological relaxation of a crystal with a facet*, Phys. Rev. B, Vol. 71 (2005), 165432 (22pp).

16. H. A. Stone, M. J. Aziz, and D. Margetis, *Grooving of grain boundary by evaporation-condensation below the roughening transition*, J. Appl. Phys., Vol. 97 (2005), 113535 (6pp).

17. J. Choi*, D. Margetis, T. M. Squires†, and M. Z. Bazant, *Steady advection-diffusion around finite absorbers in two-dimensional potential flows*, J. Fluid Mech., Vol. 536 (2005), pp. 155–184.

18. D. Margetis and J. Choi*, *Generalized iteration method for first-kind integral equations*, Studies in Appl. Math., Vol. 117 (2006), pp. 1–25.

19. D. Margetis and N. Savva*, *Low-frequency currents induced in adjacent spherical cells*, J. Math. Phys., Vol. 47 (2006), 042902 (18pp). (Also selected to appear online in the Virtual Journal of Biological Physics Research, May 1, 2006.)

20. D. Margetis and R. V. Kohn, *Continuum relaxation of interacting steps on crystal surfaces in 2+1 dimensions*, (SIAM) Multiscale Model. Simul., Vol. 5 (2006), pp. 729–758.

21. D. Margetis and J. M. Myers, *Operation-induced decoherence by nonrelativistic scattering from a quantum memory*, J. Phys. A: Math. Gen., Vol. 39 (2006), pp. 11567–11581.

* The asterisk (*) (or dagger, †) in this CV means that the indicated co-author was a student (or postdoc) when the article was being written. It is my practice to have students (*) and postdocs (†) listed as first authors if they write a substantial part of the first draft.

22. D. Margetis, P.-W. Fok*, M. J. Aziz, and H. A. Stone, *Continuum theory of nanostructure decay via a microscale condition*, Phys. Rev. Lett., Vol. 97 (2006), 096102 (4pp). (Also selected to appear online in the Virtual Journal of Nanoscale Science & Technology, September 11, 2006.)

23. P.-W. Fok†, R. R. Rosales, and D. Margetis, *Unification of step bunching phenomena on vicinal surfaces*, Phys. Rev. B, Vol. 76 (2007), 033408 (4pp). (Also selected to appear online in the Virtual Journal of Nanoscale Science & Technology, July 23, 2007.)

24. D. Margetis, *Unified continuum approach to crystal surface morphological relaxation*, Phys. Rev. B, Vol. 76 (2007), 193403 (4pp).

25. D. Margetis and M. G. Grillakis, *Impurity and quaternions in nonrelativistic scattering from a quantum memory*, J. Phys. A: Math. Theor. (formerly, J. Phys. A: Math. Gen.), Vol. 41 (2008), 065307 (15pp).

26. D. Margetis and R. E. Caflisch, *Anisotropic step stiffness from a kinetic model of epitaxial growth*, (SIAM) Multiscale Model. Simul., Vol. 7 (2008), pp. 242–273.

27. J. Quah* and D. Margetis, *Anisotropic diffusion in continuum relaxation of stepped crystal surfaces*, J. Phys. A: Math. Theor. (formerly, J. Phys. A: Math. Gen.), Vol. 41 (2008), 235004 (18pp).

28. M. G. Grillakis and D. Margetis, *A priori estimates for many-body Hamiltonian evolution of interacting Boson system*, J. Hyperb. Diff. Eqs., Vol. 5 (2008), 857–883.

29. D. Margetis, *Solvable model for pair excitation in trapped Boson gas at zero temperature*, J. Phys. A: Math. Theor. (formerly, J. Phys. A: Math. Gen.), Vol. 41 (2008), 385002 (18pp); *Corrigendum*, J. Phys. A: Math. Theor., Vol. 41 (2008), 459801 (1p).

30. J. Quah*, J. Young*, and D. Margetis, *Macroscopic view of crystal-step transparency*, Phys. Rev. E, Vol. 78 (2008), 042602 (4pp).

31. P.-W. Fok†, R. R. Rosales, and D. Margetis, *Facet evolution on supported nanostructures: The effect of finite height*, Phys. Rev. B, Vol. 78 (2008), 235401 (17pp).

32. D. Margetis and A. E. Tzavaras, *Kinetic hierarchies and macroscopic limits for crystalline steps in 1+1 dimensions*, (SIAM) Multiscale Model. Simul., Vol. 7 (2009), pp. 1428–1454.

33. D. Margetis, *Homogenization of reconstructed crystal surfaces: Fick's law of diffusion*, Phys. Rev. E, Vol. 79 (2009), 052601 (4pp).

34. A. Bonito, R. H. Nochetto, J. Quah*, and D. Margetis, *Self-organization of decaying surface corrugations: A numerical study*, Phys. Rev. E, Vol. 79 (2009), 050601(R) (4pp).

35. M. G. Grillakis, M. Machedon, and D. Margetis, *Second-order corrections to mean field evolution of weakly interacting Bosons. I.*, Commun. Math. Phys., Vol. 294 (2010), pp. 273–301.

36. J. Quah* and D. Margetis, *Electromigration in macroscopic relaxation of stepped surfaces*, (SIAM) Multiscale Model. Simul., Vol. 8 (2010), pp. 667–700.

37. D. Margetis, *A stochastic step flow model with growth in 1+1 dimensions*, J. Phys. A: Math. Theor., Vol. 43 (2010), 065003 (22pp).

38. J. Quah, L. P. Liang*, and D. Margetis, *Formulas for the force dipole interaction of surface line defects in homoepitaxy*, J. Phys. A: Math. Theor., Vol. 43 (2010), 455001 (20pp).

39. P. Patrone*, T. L. Einstein, and D. Margetis, *One-dimensional model of interacting-step fluctuations on vicinal surfaces: Analytical formulas and kinetic Monte-Carlo simulations*, Phys. Rev. E, Vol. 82 (2010), 061601 (18pp).

40. D. Margetis and K. Nakamura*, *From crystal steps to continuum laws: Behavior near large facets in one dimension*, Physica D, Vol. 240 (2011), pp. 1100–1110.

41. P. N. Patrone*, R. Wang*, and D. Margetis, *Small fluctuations in epitaxial growth via conservative noise*, J. Phys. A: Math. Theor., Vol. 44 (2011), 315002 (22pp).

42. M. G. Grillakis, M. Machedon, and D. Margetis, *Second-order corrections to mean field evolution of weakly interacting Bosons. II.*, Advances in Mathematics, Vol. 228 (2011), pp. 1788–1815.

43. P. N. Patrone*, R. E. Caflisch, and D. Margetis, *Characterizing equilibrium in epitaxial growth*, Europhys. Lett., Vol. 97 (2012), 48012 (5pp).

44. D. Margetis, *Bose-Einstein condensation beyond mean field: Many-body bound state of periodic microstructure*, (SIAM) Multisc. Model. Simul., Vol. 10 (2012), pp. 383–417.

45. D. Margetis and K. Nakamura*, *Homogenization of composite vicinal surfaces: Evolution laws in 1+1 dimensions*, Physica D,Vol. 241 (2012), pp. 1179–1189.

46. K. Nakamura* and D. Margetis, *Discrete and continuum relaxation dynamics of faceted crystal surface in evaporation models*, (SIAM) Multisc. Model. Simul., Vol. 11 (2013), pp. 244–281.

47. K. Nakamura* and D. Margetis, *Phase field model for reconstructed stepped surface*, Phys. Rev. E, Vol. 88 (2013), 014401 (4pp).

48. P. N. Patrone* and D. Margetis, *Connection of kinetic Monte Carlo model for surfaces to one-step flow theory in 1+1 dimensions*, (SIAM) Multisc. Model. Simul., Vol. 12 (2014), pp. 364-395.

49. P. N. Patrone*, T. L. Einstein, and D. Margetis, *From atoms to steps: the microscopic origins of crystal evolution*, Surface Sci., Vol. 625 (2014), pp. 37–43.

50. J. Erlebacher and D. Margetis, *Mechanism of hollow nanoparticle formation due to shape fluctuations*, Phys. Rev. Lett., Vol. 112 (2014), 155505 (5pp).

51. J. P. Schneider*, K. Nakamura*, and D. Margetis, *Role of chemical potential in relaxation of faceted crystal structure*, Phys. Rev. E, Vol. 89 (2014), 062408 (12pp).

52. J. Papac†, D. Margetis, F. Gibou, and C. Ratsch, *Island dynamics model for mound formation: Effect of step-edge barrier*, Phys. Rev. E, Vol. 90 (2014), 022404 (8pp).

53. J. Lu, J.-G. Liu, and D. Margetis, *Emergence of step flow from an atomistic scheme of epitaxial growth in 1+1 dimensions*, Phys. Rev. E, Vol. 91 (2015), 032403 (8pp).

54. D. Margetis and M. Luskin, *On solutions of Maxwell's equations with dipole sources over a thin conducting film*, J. Mathematical Physics, Vol. 57 (2016), 042903 (32pp).

55. M. G. Grillakis, M. Machedon, and D. Margetis, *Evolution of Bosons at zero temper-*

ature: Modeling and analysis of pair excitation, Quarterly of Applied Mathematics, Vol. 75 (2017), 69–104 (36pp).

56. M. Maier†, D. Margetis, and M. Luskin, *Dipole excitation of surface plasmon on a conducting sheet: finite element approximation and validation*, Journal of Computational Physics, Vol. 339 (2017), 126–145 (20pp).

57. D. Margetis, M. Maier†, and M. Luskin, *On the Wiener-Hopf method for surface plasmons: Diffraction from semi-infinite metamaterial sheet*, published online in Studies in Applied Mathematics (2017) (29pp); DOI: 10.1111/sapm.12180.

58. J. P. Schneider† and D. Margetis, *Signature of microscale kinetics in mesoscale description of epitaxial growth*, Physical Review E (Rapid Communications), Vol. 96 (2017), 020802(R) (5pp).

c. Monographs, Reports, and Extension Publications

d. Book Reviews, Other Articles, and Notes

The following preprints can be found at www.math.umd.edu/∼dio/publications.html

59. J. Schneider*, P. N. Patrone, and D. Margetis, *Steric hindrance of crystal growth: Nonlinear step flow in 1+1 dimensions*, submitted to (SIAM) Multiscale Modeling and Simulation (33pp) [in review].

60. M. Maier†, D. Margetis, and M. Luskin, *Generation of surface plasmon-polaritons by edge effects*, submitted to Communications in Mathematical Sciences; arXiv:comp-ph/1702.00848 (19pp) [in review].

61. J.-G. Liu, J. Lu, D. Margetis, and J. L. Marzuola, "Asymmetry in crystal facet dynamics of homoepitaxy by a continuum model", submitted to Physica D [in review].

62. P. Mistani*, A. Guittet*, D. Bochkov*, J. Schneider†, D. Margetis, C. Ratsch, and F. Gibou, "The island dynamics model on parallel quadtree grids", submitted to the Journal of Computational Physics [in review].

e. Talks, Abstracts, and Other Professional Papers Presented

i. **Invited presentations**

1. July 22, 1996: *Exactly solvable model for electromagnetic field in air of a three-phase power line over the earth*: 1996 Institute of Electrical & Electronics Engineers (IEEE) Antennas & Propagation Society (AP-S) International Symposium, Baltimore, MD, July 21–26, 1996. (Awarded third prize in the 1996 AP-S International Student Paper Contest.)

2. July 13-18, 1997: *Electromagnetic field of a horizontal dipole below the surface of a spherical earth*: 1997 Union Radio-Scientifique Internationale (URSI, International Union of Radio Science), North American Radio Science Meeting, Montréal, Canada, July 13–18, 1997. (Awarded third prize in the 1997 URSI Student Paper Competition.)

3. March 11, 1998: *Bose-Einstein condensation in an external potential at zero temperature*: Seminar, Center for Studies in Physics and Biology, The Rockefeller University, New York, NY.

4. November 12, 1998: *Bose-Einstein condensation in an external potential*, Condensed Matter Theory Seminar, Harvard University, Cambridge, MA.

5. February 23, 1999: *General theory of Bose-Einstein condensation in an external potential*: Atomic and Molecular Physics Division Seminar, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA.

6. February 6, 2001: *Toward a general theory of Bose-Einstein condensation in an external potential*: Physical Mathematics Seminar, Department of Mathematics, M.I.T., Cambridge, MA.

7. March 27, 2002: *General theory of Bose-Einstein condensation in an external potential*: Seminar, Chemistry and Materials Science Directorate, Lawrence Livermore National Laboratory, Livermore, CA.

8. March 27, 2002: *Crystal surface relaxation below the roughening transition: Evolution of axisymmetric structures and scaling via a continuum description*: Seminar, Chemistry and Materials Science Directorate, Lawrence Livermore National Laboratory, Livermore, CA.

9. March 28, 2002: *Electronic structure of solid nitromethane: Effects of static pressure and molecular vacancies*: Seminar, Chemistry and Materials Science Directorate, Lawrence Livermore National Laboratory, Livermore, CA.

10. April 28, 2003: *Continuum description of profile scaling in nanostructure decay*: Mechanics Seminar, Department of Mechanical Engineering, M.I.T., Cambridge, MA.

11. January 27, 2004: *Continuum description of profile scaling in nanostructure decay*: Applied Mathematics Colloquium, Department of Applied Physics and Applied Mathematics, Columbia University, New York, NY.

12. January 30, 2004: *Continuum approach to profile scaling in nanostructure decay below the roughening temperature*: Applied Mathematics Seminar, Courant Institute, New York, NY.

13. February 12, 2004: *Continuum approach to profile scaling in nanostructure decay below the roughening temperature*: informal seminar, Department of Materials Science and Engineering, M.I.T., Cambridge, MA.

14. February 13, 2004: *Continuum approach to profile scaling in nanostructure decay below the roughening temperature*: Physical Mathematics Seminar, Department of Mathematics, M.I.T., Cambridge, MA.

15. May 27, 2004: *Continuum approach to profile scaling in nanostructure decay below the roughening temperature*: Applied Mathematics Seminar, Department of Mathematics, University of California, Los Angeles.

16. May 28, 2004: *Continuum approach to profile scaling in nanostructure decay below the roughening temperature*: Applied Mathematics Seminar, Division of Engineering and Applied Science, California Institute of Technology, Pasadena, CA.

17. June 4, 2004: *A continuum approach to profile scaling in nanostructure decay below the roughening temperature*: informal seminar: Division of Engineering, Brown University, Providence, RI.

18. October 27, 2004: *Towards a unified continuum theory of crystal surface morphological relaxation below roughening*: Colloquium, Department of Materials Science

and Engineering, The Johns Hopkins University, Baltimore, MD.

19. November 18-20, 2004: *Continuum theory of interacting steps on crystal surfaces in (2+1) dimensions*: invited poster presentation: Workshop on Future Challenges in Multiscale Modeling and Simulation, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN.

20. December 9, 2004: *Continuum approach to nanostructure decay below the roughening temperature*: Mathematics Colloquium, Department of Mathematics and Statistics, University of Vermont, Burlington, VT.

21. January 6, 2005: *Continuum theory of crystal surface relaxation below roughening*: Applied Mathematics Colloquium, Department of Mathematics, University of California, San Diego, CA.

22. January 25, 2005: *Unified continuum theory of crystal surface relaxation below roughening*: Special Applied Mathematics Seminar, Department of Mathematics, University of California, Los Angeles, CA.

23. February 9, 2005: *Continuum theory of crystal surface relaxation below the roughening transition*: Applied Mathematics Colloquium, Department of Mathematics, University of California, Berkeley, CA.

24. February 15, 2005: *Unified approach to crystal surface evolution below roughening*: Physical Mathematics Seminar, Department of Mathematics, M.I.T., Cambridge, MA.

25. March 11, 2005: *Unified approach to crystal surface evolution below roughening*: Condensed Matter and Applied Physics Colloquium, Division of Engineering & Applied Sciences and Department of Physics, Harvard University, Cambridge, MA.

26. May 16, 2005: *Multiscale aspects of surface morphology evolution*: informal seminar: Mini-Workshop on Continuum Treatments of Crystal Surface Morphology Evolution, Division of Engineering & Applied Sciences, Harvard University, Cambridge, MA, May 16-17, 2005.

27. June 10, 2005: *Continuum approach to crystal surface morphology evolution*: Workshop on Effective Theories for Materials and Macromolecules, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, June 8-11, 2005.

28. August 8, 2005: *Continuum approach to crystal surface morphology evolution below roughening*: Current Challenges in Mechanics and Materials, Thin-Air Philosophical Society Symposium, University of Wyoming, Laramie, WY, August 8-11, 2005.

29. September 2, 2005: *Continuum approach to crystal surface morphological evolution*: Surface Physics Group Seminar, Department of Physics, University of Maryland, College Park, MD.

30. October 19, 2005: *Crystal surface evolution: From atomic steps to continuum laws and free-boundary problems*: Applied Mathematics Colloquium, Department of Mathematics, University of California, Los Angeles, CA.

31. October 26, 2005: *Continuum approach to crystal surface morphological evolution*: Seminar, Theoretical and Applied Mechanics (TAM), Cornell University,

Ithaca, NY.

32. November 1, 2005: *Surfaces of crystalline materials: From microscopic models to continuum laws*: Mathematics Colloquium, Department of Mathematics, State University of New York (SUNY), Buffalo, NY.

33. November 10, 2005: *Evolution of crystal surfaces: From microscopic models to continuum laws*: PDE & Applied Math Seminar, Department of Mathematics, University of Maryland, College Park, MD.

34. November 16, 2005: *Surfaces of crystalline materials: From atomic steps to continuum evolution laws*: Program on "Bridging Time and Length Scales in Materials Science and Bio-Physics", Institute for Pure and Applied Mathematics (IPAM), University of California, Los Angeles, CA, September 12-December 16, 2005.

35. January 12, 2006: *Mathematical modeling of crystal surfaces: From discrete schemes to continuum laws*: Department of Mathematics, State University of New York (SUNY), Buffalo, NY.

36. January 17, 2006: *Modeling of crystal surfaces: From microscopic schemes to continuum evolution laws*: PDE Seminar, Department of Mathematics, University of Minnesota, Twin Cities, MN.

37. January 27, 2006: *Mathematical modeling of crystal surfaces: From microscopic schemes to continuum laws*: Computational and Applied Mathematics Seminar, Department of Mathematics, Purdue University, Lafayette, IN.

38. February 2, 2006: *Morphological evolution of crystal surfaces: Modeling from the nanoscale to the macroscale*: Seminar, Department of Applied Mathematics & Statistics, Johns Hopkins University, Baltimore, MD.

39. February 9, 2006: *Modeling crystal surface evolution: From microscopic schemes to continuum laws*: Applied and Computational Mathematics Seminar, Department of Mathematics, Georgia Institute of Technology, Atlanta, GA.

40. February 21, 2006: *Morphological evolution of crystal surfaces: Modeling from nanoscale to macroscale*: Statistical Physics Seminar, Institute for Physical Science and Technology (IPST), University of Maryland, College Park, MD.

41. March 13, 2006: *Morphological evolution of crystal surfaces: From step motion to a continuum theory*: 2006 March Meeting of the American Physical Society (APS), Baltimore, MD.

42. March 27, 2006: *Modeling of crystal surface morphological evolution: From discrete schemes to continuum laws*: Colloquium, Department of Computational & Applied Mathematics, Rice University,
Houston, TX.

43. March 31, 2006: *Nonlinear dynamics of crystal surfaces: From discrete schemes to continuum laws*: Workshop on Nonlinearity and Randomness in Complex Systems, Department of Mathematics, State University of New York (SUNY), Buffalo, NY.

44. April 20, 2006: *Mathematical modeling of crystal surfaces: From discrete schemes to continuum laws*: Seminar on Multiscale Modeling and Computations, Department of Mathematics, Pennsylvania State University, University Park, PA.

45. August 27, 2006: *State transformation in quantum memory: Impurity caused by*

time limits: Third Feynman Festival, Department of Physics, University of Maryland, College Park, MD.

46. October 13, 2006: *Evolution of crystal surfaces: From discrete schemes to continuum laws*: Applied Mathematics Colloquium, Department of Mathematics, University of Arizona, Tucson, AZ.

47. October 18, 2006: *From physics-based discrete schemes to PDE's and moving-boundary problems*: Graduate Minicourse, Department of Mathematics, University of Maryland, College Park, MD.

48. October 26, 2006: *Evolution of crystal surfaces: Modeling and analysis from the nanoscale to the macroscale*: Graduate Seminar, Department of Mechanical Engineering, University of Houston, Houston, TX.

49. November 11, 2006: *Modeling and analysis of crystal surface evolution: from microscopic physics to continuum laws*: Society for Natural Philosophy (SNP) Conference, Department of Mathematics, Purdue University, Lafayette, IN.

50. November 15, 2006: *Aspects of computing from the perspective of Schrödinger's PDE*: Graduate Minicourse Series, Department of Mathematics, University of Maryland, College Park, MD.

51. March 14, 2007: *Recent surprises in asymptotics for continuum mechanics*: Plasma Physics Seminar, Institute for Plasma Research (IREAP), University of Maryland, College Park, MD.

52. April 4, 2007: *From microscopic physics to continuum laws for crystal surfaces: progress and challenges*: CSCAMM Seminar, Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD.

53. April 23, 2007: *Modeling stepped surfaces across the scales: facet evolution and anisotropic step stiffness*: Workshop on Nonequilibrium Interface and Surface Dynamics: Theory, Experiment and Simulation from Atomistic to Continuum Scales, Center for Scientific Computation And Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD.

54. May 23, 2007: *From discrete schemes to continuum laws: the case of crystal surface evolution*: Applied Analysis and PDE's Seminar, Department of Applied Mathematics, University of Crete, Heraklion (Crete), Greece.

55. June 13, 2007: *Anisotropic step stiffness from a kinetic model of epitaxial growth*: Lake Arrowhead 1st Reunion Conference: Bridging Time and Length Scales in Materials Science and Bio-physics, Institute for Pure and Applied Mathematics (IPAM), University of California at Los Angeles, Lake Arrowhead, CA, June 10-15, 2007.

56. June 25, 2007: *From microscopic physics to continuum laws in epitaxial growth: lessons, progress and challenges*: Gordon Research Conference on Thin Film & Crystal Growth Mechanisms, Mount Holyoke College, South Hadley, MA, June 24-29, 2007.

57. July 17, 2007: *Singular interfacial energy and faceting in epitaxial relaxation*: Minisymposium on Anisotropic Curvature Flow and Its Applications, 6th International Congress on Industrial and Applied Mathematics (ICIAM), Zurich, Switzerland, July 16-20, 2007.

58. July 20, 2007: *Crystal surface evolution: from discrete schemes to continuum laws*: Minisymposium on Modeling, Analysis and Simulation of Crystal Defects: Dislocation and Surface Step Dynamics Across the Scales, 6th International Congress on Industrial and Applied Mathematics (ICIAM), Zurich, Switzerland, July 16-20, 2007.

59. November 30, 2007: *From discrete models to continuum laws: The paradigm of epitaxial growth*: Mathematics Colloq., Department of Mathematics, Georgetown University, Washington, DC.

60. December 11, 2007: *Singular interfacial energy, faceting, and crystal microstructure in epitaxial relaxation*: Minisymposium on Energy Based Approaches to Nonlinear Partial Differential Equations, Society for Industrial & Applied Mathematics (SIAM) Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 10-12, 2007.

61. December 11, 2007: *Modeling and analysis of stepped crystal surfaces*: Minisymposium on From Microscopic Models to Continuum Laws: Current Challenges in Epitaxial Growth, SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 10-12, 2007.

62. January 17, 2008: *Modeling and analysis of epitaxial relaxation: From steps to the continuum*: Institute of Theoretical Physics, Department of Physics, Cologne University, Cologne, Germany.

63. January 21, 2008: *Evolution of crystal surfaces: From motion of steps to continuum theories*: informal seminar, Theory Department, Fritz Haber Institute of the Max Planck Society, Berlin, Germany.

64. February 13, 2008: *From step models to continuum laws*: Workshop on Facets of Heteroepitaxy: Theory, Experiment, and Computation, Banff International Research Station (BIRS) for Mathematical Innovation and Discovery, Banff, Canada, February 10-15, 2008.

65. April 14, 2008: *From discrete schemes to singular interfacial energies: Lessons and challenges in epitaxial relaxation*: Applied & Computational Math. Seminar, Department of Mathematics, Georgia Insitute of Technology, Atlanta, GA.

66. April 25, 2008: *Facets as shocks and other surprises in capturing discrete effects by continuum laws for crystal surfaces*: Surface Physics Group Seminar, Materials Research Sci. & Eng. Center (MRSEC), University of Maryland, College Park, MD.

67. May 1, 2008: *The case of the quantum dilute gas*: Workshop on Nonlocal Operators and Applications, Banff International Research Station (BIRS) for Mathematical Innovation and Discovery, Banff, Canada, April 27 - May 2, 2008.

68. May 12, 2008: *Unification of step bunching phenomena on vicinal surfaces*: invited Lecture: Minisymposium on Instabilities During Epitaxy: From Step Bunching To Phase Segregation, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 11-14, 2008.

69. May 14, 2008: *Kinetic hierarchies and continuum limits for stepped crystal surfaces*: Minisymposium on Kinetics and Fluctuations of Crystal Surfaces: From Discrete Models to Continuum, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 11-14, 2008.

70. May 27-30, 2008: Invited participation: Workshop on Quantitative Approaches to Cell Motility and Chemotaxis, Institute for Mathematics and Its Applications (IMA), University of Minnesota, Minneapolis, MN.

71. November 3-7, 2008: Invited participation: Workshop on Development and Analysis of Multiscale Methods, Institute for Mathematics and Its Applications (IMA), University of Minnesota, Minneapolis, MN.

72. December 10, 2008: *On kinetic descriptions of crystal surface evolution*, CSCAMM Seminar, University of Maryland, College Park, MD.

73. March 27, 2009: *Deconstructing surface reconstruction: Fick's law of diffusion*: Surface Physics Group Seminar, Materials Research Sci. & Eng. Center (MRSEC), University of Maryland, College Park, MD.

74. April 3, 2009: *Macroscopic evolution of epitaxial material systems: The story of two scales*: Mathematics Colloquium, Department of Mathematics, Howard University, Washington, DC.

75. April 10, 2009: *Kinetic aspects of crystal surface evolution: Modeling and analysis*: Applied and Computational Math Seminar, Department of Mathematics, George Mason University, Fairfax, VA.

76. December 8, 2009: *Crystal surface diffusion: Numerical simulations and homogenization*: Minisymposium on Singular and Degenerating Parabolic Problems and Weighted Curvature Flows, SIAM Conference on Analysis of Partial Differential Equations, Miami, FL, Dec. 7-10, 2009.

77. December 9, 2009: *Kinetic descriptions of evolution of crystalline surfaces*: Minisymposium on Kinetic approaches in Materials Science, SIAM Conference on Analysis of Partial Differential Equations, Miami, FL, Dec. 7-10, 2009.

78. February 5, 2010: *Crystal surface motion: A story of two scales*: Applied Mathematics Seminar, Courant Institute of Mathematical Sciences, New York University, New York, NY.

79. March 4, 2010: *Epitaxial growth: A two-scale perspective*: Applied Mathematics Seminar, Department of Mathematics, George Washington University, Washington, DC.

80. March 25, 2010: *Two tales of two scales in (1+1)-dimensional epitaxy*: PDE and Applied Math Seminar, Department of Mathematics, University of Maryland, College Park, MD.

81. May 24, 2010: *Step dynamics: Deterministic and stochastic effects in mound decay and growth*: Minisymposium on Growth and Relaxation of Epitaxial Thin Films, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 23-26, 2010.

82. July 26-30, 2010: Invited Tutorial Lectures: Interdisciplinary Conference on Mathematical Aspects of Crystal Growth, Minisemester on Evolution of Interfaces, Sapporo, Japan, July 12-August 13, 2010.

83. August 16, 2010: *Higher-order correction to mean-field evolution for interacting Bosons*: Minisymposium on "Bose-Einstein Condensation: Modeling, Analysis and Simulation", SIAM Conference on Nonlinear Waves and Coherent Structures,

Philadelphia, PA, August 16-19, 2010.

84. September 9, 2010: *Two tales of two scales in homoepitaxial relaxation and growth*: Invited Seminar, Mechanical and Materials Engineering (MME) Symposium Series, The School of Mechanical and Materials Engineering, Washington State University, Pullman, WA.

85. October 18-22, 2010: Invited participation: Workshop on Computing with Uncertainty: Mathematical Modeling, Numerical Approximation and Large Scale Optimization of Complex Systems with Uncertainty, Institute for Mathematics and Its Applications (IMA), University of Minnesota, Minneapolis, MN.

86. December 1, 2010: *Stochastic models of epitaxial growth: Mean-field theory and kinetic Monte-Carlo simulations*: Contributed talk, 2010 Materials Research Society (MRS) Fall Meeting, Boston, MA. (The talk was published in MRS Proceedings.)

87. December 8, 2010: *A stochastic view of epitaxial growth*: Invited seminar, Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD.

88. March 23, 2011: *Mean field approach to fluctuations of surface line defects*: contributed talk, APS March Meeting 2011, American Physical Society, Dallas, TX, March 21-25, 2011.

89. April 12, 2011: *A stochastic view of epitaxial growth*: Invited seminar, Applied Math Seminar series, Department of Mathematics, University of Delaware, Newark, DE.

90. April 21, 2011: *Bose-Einstein condensation: Nonlocality and homogenization in a trap*: Invited Seminar, PDE & Applied Math Seminar series, Department of Mathematics, University of Maryland, College Park, MD.

91. May 3, 2011: *Stochastic model for epitaxial system in 1+1 dimensions*: Invited seminar, Informal Statistical Physics Seminar series, Institute for Physical Science & Technology (IPST), Univ. Maryland, College Park, MD.

92. July 18, 2011: *Notions of singular interfacial energy in epitaxial relaxation*: Invited talk for the Minisymposium on "Anisotropic Evolution of Interfaces", 7th International Congress on Industrial and Applied Mathematics (ICIAM), Vancouver, Canada, July 18-22, 2011.

93. November 16, 2011: *A tale of two scales: From discrete schemes to Partial Differential Equations in epitaxial growth*: Invited Lecture, Fall 2011 Meeting for the Washington-Baltimore Section of the Society for Industrial and Applied Mathematics (SIAM), Johns Hopkins University, Baltimore, MD.

94. November 18, 2011: *From step motion to continuum laws in epitaxial relaxation: Lessons and challenges*: Invited seminar, Materials Science & Engineering Seminar Series, University of Maryland, College Park, MD.

95. December 1, 2011: *Discrete and continuum dynamics of faceted crystal surfaces*: Contributed talk, 2011 Materials Research Society (MRS) Fall Meeting, Boston, MA.

96. February 23, 2012: *Dynamics of facets on crystal surfaces*: Invited seminar, Applied Dynamics Seminar, University of Maryland, College Park, MD.

97. March 18, 2012: *Bose-Einstein condensation beyond mean field: Many-body*

bound state of periodic microstructure: Invited talk, American Mathematical Society (AMS) 2012 Spring Eastern Sectional Meeting, George Washington University, Washington, DC, March 17-18, 2012.

98. April 25, 2012: *Homogenization of bound state of Bose-Einstein gas*: Invited seminar, Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD.

99. June 1, 2012: *Crystal facets in epitaxy-Progress and challenges*: Invited talk, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI, May 30-June 1, 2012.

100. July 13, 2012: *On the dynamics of crystal facets in materials surface relaxation*: Invited talk, 2012 SIAM Annual Meeting, Minneapolis, MN, July 9-13, 2012.

101. September 13, 2012: *Crystal facets in materials surface relaxation: A two-scale perspective*: Invited talk, Special Workshop: Mathematics and the Materials Genome Initiative, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, September 12-15, 2012.

102. December 6, 2012: *A two-scale view of crystal facets*: Invited talk, Workshop IV: Computational Methods for Multiscale Modeling of Materials Defects, Program on "Materials Defects: Mathematics, Computation, and Engineering", Institute for Pure and Applied Mathematics (IPAM), University of California, Los Angeles, CA, November 10-December 8, 2012.

103. April 23, 2013: *A multiscale perspective of epitaxial growth*: Invited seminar, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA.

104. May 15, 2013: *Bose-Einstein condensation: Bound states with periodic microstructure*: Invited talk, workshop on "Quantum Systems: A Mathematical Journey from Few to Many Particles", Center for Scientific Computation and Mathematical Modeling (CSCAMM), University of Maryland, College Park, MD.

105. June 12, 2013: *Aspects of faceting in epitaxial relaxation*: Minisymposium on Morphological Evolution of Crystalline Surfaces, Thin Films, and Clusters, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA.

106. September 11, 2013: *Modeling of crystal surfaces: A journey from atoms to PDEs and back*: Math Colloquium, Department of Mathematics, University of Maryland, College Park, MD.

107. October 28, 2013: *A tale of three scales in modeling crystal surface relaxation*: Invited seminar, Applied Math and Analysis Seminar Series, Department of Mathematics, Duke University, Durham, NC.

108. December 4, 2013: *Bose-Einstein condensation: PDE aspects beyond the Gross-Pitaevskii mean field regime*: Invited seminar, PDE Seminar Series, Department of Mathematics, University of Minnesota, Minneapolis, MN.

109. December 8, 2013: *Crystal facets: From microscale motion to singular-diffusion PDEs*: Invited talk, Minisymposium on The Directional Diffusion: Models and Analysis, SIAM Conference on Analysis of PDEs, Lake Buena Vista, FL.

110. February 24, 2014: *Bose-Einstein condensation: Pair-excitation and many-body*

bound state of periodic microstructure: Invited Colloquium talk, Center of Excellence on Quantum Matter and Materials, Cologne University, Cologne, Germany.

111. March 4, 2014: *Bose-Einstein condensation: PDE aspects beyond the Gross-Pitaevskii mean field regime*: Invited Seminar, Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany.

112. March 27, 2014: *Bose-Einstein condensation: Recent progress and challenges*: Invited talk, workshop on "Mathematical and Numerical Methods for Complex Quantum Systems", University of Illinois at Chicago, Chicago, IL, March 26-30, 2014.

113. April 8, 2014: *The microscopic origins of crystal surface evolution*: Invited seminar, Applied Analysis and Computation Seminar, Department of Mathematics and Statistics, University of Massachusetts, Amherst, MA.

114. June 2-4, 2014: *Bose-Einstein condensation beyond mean field: Recent advances and challenges*: Three Invited lectures, Université Claude Bernard Lyon 1, Villeurbanne, France.

115. June 10, 2014: *On the microscopic origins of crystal evolution*: Invited talk, 1st reunion conference for Program on "Materials Defects: Mathematics, Computation, and Engineering", Institute for Pure and Applied Mathematics (IPAM), UCLA Conference Center, Lake Arrowhead, CA.

116. September 16, 2014: *Quantum many-body dynamics: Some rigorous results on Bose-Einstein condensation*: Invited seminar, Informal Statistical Physics Seminar Series, Institute for Physical Science and Technology (IPST), University of Maryland, College Park.

117. October 31, 2014: *A tale of three scales in crystal evolution*: Invited seminar, Applied Interdisciplinary Mathematics Seminar Series, Department of Mathematics, University of Michigan, Ann Arbor, MI.

118. April 10, 2015: *On the microscopic origins of crystal growth*: invited Applied Mathematics Seminar, Courant Institute of Mathematical Sciences, New York University, New York, NY.

119. June 9, 2015: *Mesoscale limit of stochastic particle scheme in epitaxy*: Invited participant and speaker, 2nd reunion conference for Program on "Materials Defects: Mathematics, Computation, and Engineering", Institute for Pure and Applied Mathematics (IPAM), UCLA Conference Center, Lake Arrowhead, CA.

120. October 30, 2015: *Electromagnetic field of dipole on Graphene sheet*: Invited speaker, Informal Applied Physics Seminar, Kaxiras Group, Department of Physics, Harvard University, Cambridge, MA.

121. December 8, 2015: *Beyond the Burton-Cabrera-Frank (BCF) model of surface defects: A study in 1+1 dimensions*: Invited speaker: Minisymposium on PDEs for Defects Problems in Materials Science, SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ.

122. May 9, 2016: *From atomistic dynamics to mesoscale descriptions of crystal growth*: Speaker: Minisymposium on Microscopic Processes and Non-Equilibrium Phenomena in Epitaxial Growth, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA.

123. May 16, 2016: *Aspects of many-Boson dynamics*: Invited Speaker: KI-Net Conference on Mathematical and Computational Methods in Quantum Chemistry, Yale University, New Haven, CT.

124. June 4, 2016: *A three-scale perspective of epitaxy: From atomistic dynamics to Partial Differential Equations*: Invited minisymposium speaker: Minisymposium X (Materials Science), 13th annual conference on "Frontiers in Applied and Computational Mathematics" (FACM), New Jersey Institute of Technology, Newark, NJ.

125. August 8, 2016: *Aspects of pair excitations in Bose-Einstein condensation*: Speaker: Minisymposium on Quantum Many-Body Dynamics: Analysis and Modeling, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA.

126. October 5, 2016: *Epitaxial growth: From atomistic dynamics to mesoscale models*: Invited Seminar: Applied Mathematics Seminar Series: Department of Mathematics, University of California, Berkeley.

127. February 7, 2017: *Problems in evolution of crystal facets from a continuum (PDE) view*: Invited talk: Materials Working Group Seminar Series, Courant Institute of Mathematical Sciences, New York University, New York.

128. February 10, 2017: *From atomistic dynamics to mesoscale model of epitaxial growth*: Invited seminar: Applied Mathematics Seminar Series, Courant Institute of Mathematical Sciences, New York University, New York.

129. February 24, 2017: *Surface plasmons on graphene: An analytical study*: Invited talk: NIST Day, Center for Scientific Computation and Mathematical Modeling (CSCAMM), Univ. of Maryland, College Park, MD.

130. May 18, 2017: *Effects of geometry on surface plasmons-polaritons: An analytical approach*: Invited talk: Workshop on Mathematical Modeling of 2D Materials, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN.

131. June 12, 2017: *Effects of geometry on surface plasmon-polaritons: An analytical approach*: Invited Seminar: Institut Lumiere Matiere, Univ. Claude Bernard Lyon 1, Lyon, France.

132. July 12, 2017: *Steric hindrance of crystal growth: Nonlinear mesoscale model in 1+1 dimensions*: Invited talk: Minisymposium on Modeling and Simulation of Nanostructures and 2D Materials, 2017 SIAM Annual Meeting, Pittsburgh, PA.

133. August 17, 2017: *Master-equation approach to mesoscale description of epitaxial growth*: Invited talk: Working Group on Multiscale Strategies, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN.

ii. **Refereed conference proceedings**

1. D. Margetis, P. N. Patrone*, and T. L. Einstein, *Stochastic models of epitaxial growth*, 2010 Materials Research Society (MRS) Fall Meeting Proceedings, Vol. 1318 (2011), pp. UU7.4.1–UU7.4.6 (mrsf10-1318-uu07-04).

iii. **Unrefereed conference proceedings**

f. Films, Tapes, Photographs, etc.

g. Exhibits, Performances, Demonstrations, and other Creative Activities

h. Original Designs, Plans, Inventions, and Patents

i. Grants

1. *National Science Foundation (NSF) Research Award*, DMS-1412769: Division of Mathematical Sciences (DMS). Total amount (Univ. Maryland portion): $260,491. Period: 08/2015 – 07/2018. Principal Investigator (PI). Project title: *Collaborative Research: Modeling and Simulation of Out-of-Equilibrium Processes in Epitaxy*. Other PI's: Frederic Gibou (Univ. California, Santa Barbara), Christian Ratsch (Univ. California, Los Angeles).

2. *National Science Foundation (NSF) Research Award*, DMS-1517162: Division of Mathematical Sciences (DMS). Total amount: $243,687. Period: 07/2015 – 06/2018. Principal Investigator (PI). Project title: *Bose-Einstein Condensation Beyond Mean Field: A Partial Differential Equation Approach to Quantum Fluctuations*.

3. *MAPS-REU*, DMS-1359307: Division of Mathematical Sciences, National Science Foundation (NSF), 03/2014 – 08/2016. Senior Personnel. PI: K. Okoudjou. Title: *REU Site: Mathematics, Applied Mathematics, and Statistics Research Experience for Undergraduates*.

4. *Ki-Net*, DMS-1107444: Division of Mathematical Sciences, National Science Foundation (NSF), 03/2012 – 02/2017. Core participant, CSCAMM node. PI: E. Tadmor. Project title: *Collaborative Research: RNMS: Kinetic Description of Emerging Challenges in Multiscale Problems of Natural Sciences*.

5. *Faculty Early Career Development Award (CAREER)*, DMS-0847587: Division of Mathematical Sciences, National Science Foundation (NSF), $475,000, 08/2009 – 07/014. PI. Project title: *Thermodynamic and Kinetic Approaches for Epitaxial Material Systems*.

6. *Seed Funding, UMd*: PI. NSF/Materials Research Science & Engineering Center (MRSEC), Univ. Maryland, $21,000, 07/2007 – 06/09. Project title: *Mean Field Theory for Elastic Effects on Crystal Surfaces*.

j. Fellowships, Prizes, Awards and Honors

1. State Scholarships Foundation Award, distinction in entrance exams, National Technical University of Athens (NTUA), 1987.

2. State Scholarships Foundation Fellow, top student in Department of Electrical Engineering, National Technical University of Athens (NTUA), 1988–1992.

3. M. Stai Fellow, Kapodistrian University of Athens, 1987–1992, 1993–1996.

4. Thomaidion Award, top graduate of Department of Electrical Engineering, National Technical University of Athens (NTUA), 1993.

5. C. C. Kao Fellow, best 1st-year PhD student in Division of Applied Sciences, Harvard University, 1994–1995.

6. 3rd Prize, Student Paper Contest, IEEE Antennas & Propagation Society International Symposium, Baltimore, MD, 1996.

7. 3rd Prize, Student Paper Competition, North Amer. Radio Sci. Meeting, Montréal, Canada, 1997.

8. Faculty Early Career Development Award (CAREER), DMS-0847587: Division of Mathematical Sciences, National Science Foundation (NSF), 2009-14.

9. 2013-14 Research and Scholarship Award (RASA), Univ. of Maryland (Spring '14).

k. Editorships, Editorial Boards, and Reviewing Activities for Journals and other Learned Publications

1. Invited reviewer for professional journals including: *Multiscale Modeling & Simulation* (SIAM); *SIAM Journal on Applied Mathematics*; *Journal of Physics A: Mathematical & Theoretical* (UK); *Proceedings of the Royal Society of London A* (UK); *Physical Review Letters*; *Studies in Applied Mathematics*; *Europhysics Letters*; *Physics Letters A*; *Applied Mathematics Letters*; *Physica D*; *Journal of Mathematical Physics*; *Annals of Physics*; *Physical Review E*; *Applied Physics Letters*; *IET Microwaves, Antennas & Propagation*; *American Mathematical Monthly*; *Communications in Mathematical Physics*; *The European Physical Journal B*; *Nonlinearity*; *New Journal of Physics*; *Journal of Optics*; *Journal of Physics B*.

l. Other Distinctions

1. Elected Full Member of Sigma Xi, The Scientific Research Society, 08/2000-todate.

3. TEACHING, MENTORING AND ADVISING

a. Courses taught/to be taught

University of Maryland, College Park

Semester	Course	Class size
Fall 06, Spring '11,'15	MATH463: Complx. Variables for Scients. & Engrs.	23('06), 25('11) 30('15)
Fall 07-11, '13, '15, '17	MATH241: Calculus III	245('07), 215('08), 235('09), 278('10) 220('11), 238('13) 227 ('15)
Spring '15	MATH241	222('15)
Spring 07-09, '13	MATH648M(Spec. Topics): Adv. Analytic Methods	24('07), 32('08), 30('09), 22('13)
Fall 09, 10	MATH673: Partial Differential Equations I	30('09), 16('10)
Fall 09, Spring '10, 11	AMSC698: Advanced Topics in Appl. Math. (non-credit reading course)	3('09), 7('10), 3('11)
Spring '10	MATH674: Partial Differential Equations II	22
Fall '11, '14, '15	MATH424: Mathematics of Finance	30('11), 25('14) 28 ('15)
Spring '16	MATH858M: Asymptotic Methods w/ Applications	10
Fall '16, '17	AMSC/CMSC466: Introduction to Num. Analysis I	30
Spring '17	MATH462: Partial Differential Equations	20
Spring '17	AMSC808A: Advanced Topics in Appl. Math. (non-credit reading course)	2

Massachusetts Institute of Technology

Semester	Course	Class size
Spring 2003 - 06	18.306: Advanced PDEs	40 (est. avg.)

	w/ Applications (grad.)	
Fall 03, Spring 02, 06	18.307: Integral Eqs (grad.)	10 (est. avg.)
Fall 04, Spring 06	18.075: Adv. Calc. for Engrs (grad.)	25 (est. avg.)
Fall 2005	18.305: Adv. Analytic Methods in Sci. & Eng. (grad.; co-taught)	15

Harvard University

Semester	Course	Class size
Fall 2001	Applied Math 105a: Complex & Fourier Analysis	70

b. Course or Curriculum Development

1. Development of the graduate special-topics courses MATH 648M: Advanced Analytic Methods with Applications, in Spring 2007. The course has attracted students from Mathematics, Physics, Geology, Chemical Physics and several areas of Engineering. I mentored 3 other faculty members who taught variants of the course in Spring 2010-12 and Spring 2015.

2. Development of the new graduate special-topics course MATH 858M: Asymptotic Methods with Applications, in Spring 2016. The course has attracted a total of 10 students (1 of whom audits the course without registering) from Mathematics, Physics and Mechanical Engineering. The course material includes recent results from my own research in mathematical physics.

c. Manuals, Notes, and Other Contributions to Teaching

1. M.I.T. OpenCourseWare Program: Publication of applied math courses 18.075, 18.306, 18.307 to Worldwide Web; Spring 2004, 06, Fall 2005.
2. Outreach Program, Materials Research Science & Engineering Center (MRSEC), Univ. Maryland: Lecture and hands-on demonstrations on *How Does Math Work in the Nano-World?* at: (i) Nicholas Orem Middle School, Hyattsville, MD, May 27, 2010; (ii) Ernest Everette Just Middle School, Mitchellville, MD: April 28, 2011, March 7, 2012, and April 9, 2013.

d. Teaching Awards and Other Special Recognition

1. Distinction in Teaching, Faculty of Arts and Sciences, Harvard University, 2001.

2. Graduate Teaching Award, School of Science, MIT, 2004.

3. Dean's Prize for Excellence in Graduate Education (by faculty nomination), School of Science, MIT, 2006.

4. Excellence Certificate, in recognition of outstanding service in Education Outreach, Materials Research Science and Engineering Center (MRSEC), Univ. Maryland, 2008.

5. Dean's Award for Excellence in Teaching, College of Computer, Mathematical and Natural Sciences, Univ. Maryland, 2011.

e. Advising (Other Than Research Direction)

i. **Undergraduate**

1. Academic advising: Students: Anna Konstant Skoromudova, Comp. Sci. major, Fall 2013; Yuting Huang, Statistics major, Spring 2014; Luke P. Corcos, Physics major, Spring 2015; Daniel Mariño-Johnson, Math. major, Spring 2015; Ryan Gentry, Aerosp. Eng., Spring 2015; Efren Abreu, Economics and Math., Spring 2015;

Jianong Li, Statistics, Spring 2015; Rhianna Michaud, Comp. Science, Spring 2015. In addition: 2 undergraduate students, UMD, Fall 2015.

ii. **Graduate**

1. Academic advising: Students: Mr. Ian Johnson, Applied Math. & Sci. Comp. program (AMSC), Fall 2015 and Spring 2016;

Mr. Stephen Sorokanich, Applied Math. & Sci. Comp. program (AMSC), Fall 2015-16 and Spring 2016-17;

Mr. Onur Kara, Chemistry, Spring 2017.

iii. **Other advising and mentoring activities**

f. Advising or Mentoring: Research Direction

i. **Undergraduate**

University of Maryland, College Park

Program	Student	Title of Project	Dates
Research Experience for Undergraduates (REU), Maryland MRSEC, '07-'09	Mr. Jerrod Young, Norfolk State Univ.	Modeling & numerics for crystal surfaces under stress	Summer 08
	Mr. Li Peng Liang, Montgomery College	Modeling and analysis of crystal-step interactions	Summer 09
Research Experience for Undergraduates (REU): Project in Math. Phys., UMd Math. Dept., 2015	Ms. Qurat Ul Ain Khan, U. North Carolina – Ashville	Bound states with the Schroedinger eq.	Summer '15
	Mr. Kyle Liss, Dickinson College	Scattering theory for quantum computing	Summer '15

ii. **Master's**

University of Maryland, College Park

M.S. student	Title of Thesis	Date Degree Conferred
Mr. I. Johnson (Appl. Math.)	Microscopic schemes in epitaxial growth	06/2016

iii. **Doctoral**

University of Maryland, College Park

Ph.D. student	Title of Thesis	Date Degree Conferred
Ms. A. Finkbiner (co-advised; Appl. Math.)	Global phenomena from local rules: Peer-to-peer networks and crystal steps	12/2007
Mr. J. Quah (Appl. Math.)	A macroscale perspective of near-equilibrium relaxation of stepped crystal surfaces	08/2009

Mr. P. Patrone (Phys.) (co-advised)	Modeling of interfaces: Applications in surface and polymer physics	06/2013
Ms. K. Nakamura (Math; co-advised)	Evolution of faceted crystal surfaces: Modeling and analysis	12/2014
Mr. J. Schneider (Appl. Math)	Multiscale modeling and simulation of stepped surfaces	08/2016
Mr. S. Sorokanich (Appl. Math.; co-advised)	Dynamics of the Bose gas at finite temperature	06/2019 (expected)
Mr. I. Johnson (Appl. Math)	Slope selection in crystal growth (tentative)	06/2019 (expected)
Mr. K. Liss (Appl. Math)	Aspects of quantum hydrodynamics (tentative)	06/2020 (expected)

Massachusetts Institute of Technology

Ph.D. student	Title of Thesis	Date
Mr. P.-W. Fok (co-advised)	Simulations of axisymmetric stepped surfaces with a facet	06/2006

iv. **Post Doctoral**

Name	Research Area	Period
Dr. Heyrim Cho (Brin postdoc, Math., UMD; co-mentored)	Numerical and theoretical methods for stochastic simulations	08/2015–to date
Dr. Matthias Maier (Math., U. Minnesota; co-mentored)	Surface plasmons on Graphene: Modeling and numerical analysis	08/2015–to date
Dr. Vera Andreeva (Math., U. Minnesota; co-mentored)	Hydrodynamic approaches to surface plasmonics	07/2017–to date

v. **Other Mentoring activities**

1. I have mentored numerous graduate students in the context of *Research Interaction Teams (RITs)* at UMD. These RITs are interdisciplinary working-group seminar series co-organized with colleagues at UMD and NIST.
These RIT series are herein listed in **Sec. 4b(ii)** below.
Most recently, in the context of these RITs, I have interacted with and mentored in class the following Ph.D. students: Saurabh Paul, Joint Quantum Institute and

Physics, UMD, Fall 2015; Mathew Ranchu, Joint Quantum Institute and Physics, UMD, Fall 2015.

4. SERVICE

a. Professional

i. Offices and committee memberships in professional organizations

1. Secretary-elect, SIAM Activity Group (SIAG) on Mathematical Aspects of Materials Science, Society for Industrial and Applied Mathematics (SIAM), Jan. 2011-Dec. 2013.

ii. Reviewing activities for agencies

1. Grant proposal reviewer (invited): Department of Energy (DOE)/Applied Mathematics, 2008, 2014.

2. Interdisciplinary panel reviewer of grant proposals (invited): National Science Foundation (NSF), Spring 2010, 2016, 2017.

3. Grant proposal reviewer (invited): Natural Sciences and Engineering Research Council of Canada (NSERC), Fall 2010.

4. Grant proposal reviewer (invited): National Science Foundation (NSF), Spring 2012, '13; Summer 2014.

5. Member, College of Reviewers for the Canada Research Chairs Program, 01/14 – present.

6. Proposal reviewer (invited): Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, Spring 2017.

iii. Other unpaid service to local, state and federal agencies

iv. Other non-University committees, commissions, panels, etc.

1. Organizer: Applicable Mathematics Seminar Series, Institute for Pure & Applied Math. (IPAM), Los Angeles, CA, Fall 2005.

2. Organizer: Minisymposium on: *From microscopic models to continuum laws: Current challenges in epitaxial growth*, Society for Industrial & Applied Mathematics (SIAM) Conference on Analysis of PDEs, Mesa, AZ, Dec. 10-12, 2007.

3. Co-organizer: Minisymposium on: *Kinetics & fluctuations of crystal surfaces: From discrete models to continuum*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 11-14, 2008.

4. Co-organizer: Minisymposium on: *Kinetic approaches in Materials Science*, SIAM Conference on Analysis of Partial Differential Equations, Miami, FL, Dec. 7-10, 2009.

5. Co-organizer: Special Session on: *Biomembranes: Modeling, analysis and computation*, Spring 2010 American Mathematical Society (AMS) Eastern Sectional meeting, New Jersey Institute of Technology, NJ, May 22, 2010.

6. Co-organizer: Minisymposium on: *Growth & relaxation of epitaxial thin films*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 23-26, 2010.

7. Co-organizer: Minisymposium on: *Surface and thin film evolution: Self-assembly, instability, pattern formation*, 2012 SIAM Annual Meeting, Minneapolis, MN, July 9-13, 2012.

8. Co-organizer: Special workshop on: *Mathematics and the Materials Genome Initiative*, Institute for Mathematics and Its Applications (IMA), University of Minnesota, Minneapolis, MN, September 12-16, 2012.

9. Co-organizer: Minisymposium on: *Morphological evolution of crystalline surfaces, thin films, & clusters*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, June 9-12, 2013.

10. Co-organizer: 2013 Summer Graduate Program on *Flow, Geometric Motion, Deformation and Mass Transport in Physiological Processes*, Institute for Mathematics and Its Applications (IMA), University of Minnesota, Minneapolis, MN, July 15-August 2, 2013.

11. Co-organizer: Symposium on *Mathematical and Computational Aspects of Materials Science*, 2014 Materials Research Society (MRS) Meeting, Boston, MA, November 30-Dec. 5, 2014.

12. Co-organizer: Minisymposium on: *Mesoscale modeling of non-equilibrium assembly, transport, & reaction processes*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 8-12, 2016.

13. Co-organizer: Minisymposium on: *Microscopic, mesoscale and macroscale models in Mechanics*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 8-12, 2016.

14. Co-organizer: Minisymposium on: *Modeling and simulation of non-equilibrium processes in epitaxial growth*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 8-12, 2016.

15. Co-organizer: Minisymposium on: *Quantum Many-Body Dynamics: Analysis and Modeling*, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 8, 2016.

16. Co-organizer: Workshop on: *Mathematical Modeling of 2D Materials*, Institute for Mathematics and its Applications, Minneapolis, MN, May 16-19, 2017.

v. **International activities not listed above**

1. Co-organizer: Minisymposium on: *Modeling, Analysis and Simulation of Crystal Defects: Dislocation and Surface Step Dynamics Across the Scales*, 6th International Congress on Industrial & Applied Mathematics, Zurich, Switzerland, July 16-20, 2007.

vi. **Paid consultancies**

1. Consultant in Project on 2D materials (within ARO MURI Award, PI: Prof. M. Luskin): University of Minnesota, Spring 2017.

b. Campus

i. **Departmental**

1. Organizer: PDE & Applied Mathematics Seminar, 2006-09.

2. Member: PDE/Applied Mathematics field committee, 2006-present.

3. Member: Admissions Committee for grad. students, Applied Mathematics & Scientific Computation (AMSC) program, Spring 2007-11.

4. Invited Member: Ph.D. Thesis Defense Committee for: A. Finkbiner, November 2007 (as co-advisor); M. S. Pauletti, August 2008; I-Kun Chen, May 2009; J. T. Halbert, May 2009; J. Quah, June 2009 (*Chair of Committee*, as *thesis advisor*); B.

E. Burrola Gabilondo, August 2010 (Physics, Dean's Rep.); X. Chen, March 2012; P. Patrone, May 2013 (Physics, as co-advisor); K. Nakamura, August 2014 (*Chair of Committee*, as *thesis co-advisor*); P. Adhikari, October 2014 (Physics, Dean's Rep.); J. Radic, October 2015 (Physics, Dean's Rep.); E. Kuz, March 2016; S. Paul, May 2016 (Physics and Joint Quantum Institute, Dean's Rep.); Aydin Cem Keser, May 2017 (Physics, Dean's Rep.); Ranchu Mathew, Aug. 2017 (Physics and JQI, Dean's Rep.).

5. Member: Preliminary Ph.D. Oral Exam Committee for: J. Quah, February 2008 (Chair of Committee, as advisor); X. Chen, April 2009; K. Nakamura, December 2010 (Chair, as advisor); J. Schneider, November 2012 (Chair, as advisor); E. Kuz, March 2013; J. Jia Wei Chong, Feb. 2016; S. Sorokanich, August 2017 (Chair, as advisor).

6. Member: Salary Committee, Department of Mathematics, Spring 2008; Merit Pay Committee, Spring 2014.

7. Chair for the course MATH 241: Calculus III, Fall 2008, '13.

8. Member: Promotion Committee of junior faculty member: M. Cameron (Mathematics), 01/11-06/12.

9. Member: Policy Committee, Department of Mathematics, 2014-15.

10. Member: Graduate Committee, Applied Mathematics & Statistics, and Scientific Computation program, 09/16-06/18.

ii. **College**

1. Co-organizer: Workshop on *Nonequilibrium Interface and Surface Dynamics: Theory, Experiment and Simulation from Atomistic to Continuum Scales* (II), Center for Scientific Computation And Mathematical Modeling (CSCAMM), Univ. Maryland, April 23-27, 2007.

2. Co-director: Research Interaction Teams (RIT's): interdisciplinary research-oriented working group seminars attended by students, postdocs, faculty:

• Fall 2006: *Schrödinger's Equations with Applications in Physics.*

• Spring 2007: *Biomembranes: Experiments, Mathematical Modeling, and Numerical Simulations.*

• Fall 07, Spring 08: *Kinetics and Fluctuations of Complex Crystal Surfaces.*

• Fall 09: *Challenges in Materials Science: Aspects of Interface Motion.*

• Fall 09-11, 13-15 & Spring 09, 13, 15: *Applied Partial Differential Equations.*

• Spring 2010: *Quantum Information and Computation.*

• Fall 10: *Non-equilibrium Interface and Surface Dynamics*

• Spring 2011: *Stochastic Dynamics: Models, Analysis, and Numerics*

• Fall 11: *Non-equilibrium Interface and Surface Dynamics: Modeling, Analysis, Numerics, and Experiment*

• Spring 12: *Aspects of Statistical Mechanics with Applications*

• Fall 14: *Particle Systems.*

• Fall 15, Spring 16: *Modeling and Analysis in Atomic Physics.*

3. Member: Selection Committee: Research Experience for Undergraduates (REU) program, Materials Research Science & Engineering Center (MRSEC), Spring 08, 09.

4. Co-organizer: Workshop on *Electromagnetic Metamaterials and Their Approximations: Practical and Theoretical Aspects*, CSCAMM, Univ. Maryland, September 22-25, 2008.

5. Co-organizer: Workshop on *Kinetic Description of Multiscale Phenomena: Kinetic Focused Research Group (FRG) Young Researchers Workshop*,
CSCAMM, Univ. Maryland, March 2-5, 2009.

6. Co-organizer: Workshop on *Nonequilibrium Interface and Surface Dynamics: Theory, Experiment and Simulation from Atomistic to Continuum Scales* (III), Center for Scientific Computation And Mathematical Modeling (CSCAMM), Univ. Maryland, October 25-28, 2010.

7. Co-organizer: Workshop on *Quantum Systems: A Mathematical Journey from Few to Many Particles*, CSCAMM, Univ. Maryland, May 13-16, 2013.

8. Organizer: Kinetic Interaction Team on Hydrodynamic Limits of Particle Systems for Crystal Surfaces, CSCAMM, Univ. Maryland, Sept. 13-16, 2013; Sept. 11-13, '15.

9. Member: Policy Committee and Salary Committee, Institute for Physical Science and Technology (IPST), 09/16-09/18.

10. Member: Internal Review Committee, Institute for Physical Science and Technology (IPST), 2017-18.

iii. **University**

1. Member: Promotion/Mentoring Committee of junior faculty member: Yifei Mo; tenure-track Assistant Professor, Department of Materials Sci. & Eng., UMD, October 2013–present.