Ami Radunskaya, Professor of Mathematics

Contact Information

Department of Mathematics, Pomona College
610 N. College Ave., Claremont CA 91711

Tel: (909) 621-8715, Fax: (909) 607-1247
Email: aer04747@pomona.edu
http://pages.pomona.edu/~aer04747

Education

1992	Ph.D. in Mathematics, Stanford University Dissertation: "Statistical Properties of Deterministic Bernoulli Flows" (advisor: Don Ornstein)
1986	B.A. in Mathematics (with honors), University of California, Berkeley

Faculty Ranks

7/07–present	Professor of Mathematics, Pomona College (Chair 7/10-6/13)
7/99–7/07	Associate Professor of Mathematics, Pomona College
7/94–7/99	Assistant Professor of Mathematics, Pomona College
9/91–7/94	G.C. Evans Instructor, Department of Mathematics, Rice University

Awards and Honors

Wig Award for Excellence in Teaching, Pomona College	2012
Falconer Lecturer, MAA Mathfest2010, Title: *Mathematical Challenges in the Treatment of Cancer*	2010
Irvine Distinguished Faculty Mentor, Pomona College	2003
Alfred Gores Award for Excellence in Teaching, Stanford University	1991

Current External Funding

NSF	Collaborative Proposal: EDGEProgram (Enhancing Diversity in Graduate Education)	$519,414	2014–2016
NSF	Predicting the Release Kinetics of Matrix Tablets	$124,472	2010–2014
NSF	Collaborative Proposal: EDGEProgram (Enhancing Diversity in Graduate Education)	$172,342	2011–2014

Professional Activities and Leadership

- Co-Director, EDGE (Enhancing Diversity in Graduate Education), www.edgeforwomen.org
- Membership Committee (2011–) and Diversity Advisory Committee (2013–), SIAM (Society of Industrial and Applied Mathematics)
- Executive Committee Member at Large and Chair, Membership Committee (2011-2014), AWM (Association of Women in Mathematics)
-Co-organizer of: Cancer and the Immune System, a workshop hosted by the Mathematical Biosciences Institute, Columbus, OH, November 17-21, 2014. http://mbi.osu.edu/event/?id=498
- Co-organizer of BEER: Biology and Ecology: Education and Research. Conference in Biomathematics. Hosted by the Claremont Colleges, sponsored by the National Science

Foundation. October 10-12, 2014
- Co-organizer of WhAM! A Research Collaboration Workshop for Women in Applied Mathematics: Dynamical Systems with Applications to Biology and Medicine. Hosted by the Institute for Mathematics and its Applications, U. of Minnesota, September 9-13, 2013. https://www.ima.umn.edu/2013-2014/SW9.9-13.13/
- Co-organizer of Modeling Problems Related to Our Environment. Hosted by the American Institute of Mathematics, Palo Alto, CA, January 14-18, 2013 http://aimath.org/ARCC/workshops/modelenvironment.html - Editor-in-Chief, CODEE (Community of ODE Educators) journal, www.codee.org
- Editor, Letters in Biosciences

PUBLICATIONS. [1]

Gabriella T. Heller [2], Theodore J. Zwang[3], Elizabeth A. Sarapata [4], Michael A. Haber [5], Matthew H. Sazinsky, Ami E. Radunskaya, Malkiat S. Johal, *Accounting for unintended binding events in the analysis of quartz crystal microbalance kinetic data*, Colloids and Surfaces B: Biointerfaces, **117**, pp 425431 (2014)

L.G. dePillis, H. Savage, [6] and A. E. Radunskaya, *Mathematical Model of Colorectal Cancer with Monoclonal Antibody Treatments*, British Journal of Medicine and Medical Research, Vol. 4, No. 16, pp: Page 3101-3131(March, 2014)

E. Buchla, P. Hinow, A. Najera*, and A. Radunskaya, *Swallowing a cellular automaton pill: predicting drug release from a matrix tablet*, Simulation: Transactions of the Society for Modeling and Simulation International, Vol. 90, No. 3, pp. 227 - 237 (March 2014)

R. Radner, A. Radunskaya and A. Sundararajan , *Dynamic pricing of network goods with boundedly rational consumers* Proceedings of the National Academy of Sciences, Vol. 111, No. 1, pp: 99104, (January 2014). doi: 10.1073/pnas.1319543110.

L.G. de Pillis, A. Radunskaya, *Modeling Immune-mediated Tumor Growth and Treatment*, book chapter in: "Mathematical Oncology 2013, Modeling and Simulation in Science, Engineering and Technology", A. d'Onofrio, A. Gandolfi (eds.), Springer Science+Business Media, doi:DOI 10.1007/978-1-4939-0458-7-7.

S. Nanda, L. G. de Pillis, A. Radunskaya, *B cell chronic lymphocytic leukemia - A model with immune response*, Discrete and Continuous Dynamical Systems - Series B, 18 (4): 1053 - 1076, (June, 2013).

D. Morgens [7], K. Lindbergh [8], M. Adachi [9], A. Radunskaya, A.R.O. Cavalcanti, *A Model for the Evolution of Extremely Fragmented Macronuclei in Ciliates*. PLoS ONE, **8**, 1053–1076 (May, 2013).

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[1]In accordance with the traditional practice in the mathematics community, authors are listed in alphabetical order on most papers.
[2]Pomona College '14
[3]Pomona College '11
[4]Harvey Mudd College '13
[5]Pomona College '13
[6]Harvey Mudd College '12
[7]Pomona College '14
[8]Pomona College '12
[9]Pomona College '11

A. Radunskaya, L. de Pillis, A. Gallegos, *A Model of Dendritic Cell Therapy for Melanoma*, Frontiers in Oncology **3** (56), 2013. doi: 10.3389/fonc.2013.00056,

A.E. Radunskaya, A. Najera, D. Durosier, Y. Louzoun, B. Peercy, M.G. Ross, B.S. Richardson, M.G. Frasch, *A mathematical model of nutrient delivery during labour: predicting fetal distress due to severe acidemia*, Experimental Biology Meeting: April 20-24, 2013, Boston, Massachusetts. The FASEB Journal. (2013);27:1217.16.

C. DuBois [10], J. Farnham, E. Aaron, A. Radunskaya, *A multiple time-scale computational model of a tumor and its micro environment*, Mathematical Biosciences and Engineering, 10 (1): 121–150, (February, 2013).   doi:10.3934/mbe.2013.10.121

S. Hook, A. Radunskaya, *Modeling the Kinetics of the Immune Response*, book chapter in: "New Challenges for Cancer Systems Biomedicine, A. d'Onofrio, P. Cerrai, A. Gandolfi, ed., SIMAI Springer Series, Springer-Verlag Italia, pp: 267-282; (2012) DOI 10.1007/978-88-470-2571-4_14.

L. de Pillis, A. Radunskaya, *Best Practices in Mathematical Modeling*, book chapter in: Computational Toxicology, Volume 1, Brad Reisfeld and Arthur Mayeno, eds., Springer Protocols, *Methods in Molecular Biology* **929** Humana Press: 51–74 (2012).

P.Hinow, A. Radunskaya, I. Tucker, L, Yang. Kinetics of bile salt binding to liposomes revealed by carboxyfluorescein release and mathematical modeling. J. of Liposome Research, 22 (3) 237–244 (Sep 2012)

Milton J, Radunskaya A, Ou W and Ohira T, *A thematic approach to undergraduate research in biomathematics: Balance control.* Math. Model. Nat. Phenom. 6(6): 260-277, (2011).

A. Gallegos, A. Radunskaya, *Do Longer Delays Matter? The Effect of Prolonging Delay in CTL Activation.* Discrete and Continuous Dynamical Systems, Supplement: 467–474 (2011). `http://arxiv.org/abs/1007.0225`

J.Milton, A. Radunskaya, L. de Pillis, A. Lee and D. Bartlett. *Team Research at the Biology-Mathematics Interface: Project Management Perspectives*, CBE - Life Science Education **9**(3), (2010), 316–322, doi: 10.1187/cbe.10-03-0021.

B. Baeumer, L. Chatterjee, P. Hinow, T. Rades, A. Radunskaya and I. Tucker. *Predicting the Drug Release Kinetics of Matrix Tablets*, Discrete and Continuous Dynamical Systems Series B (DCDS-B) **12**, No. 2, September (2009), 261–277, doi:10.3934/dcdsb.2009.12.261.

A. Radunskaya, R. Williamson, and R. Yinger. *A Dynamic Analysis of the Stability of a Network of Induction Generators*, IEEE Transactions on Power Systems, **23**, No. 2 , May (2008) 657–663, doi:10.1109/TPWRS.2008.919435.

L.G. de Pillis, A.E. Radunskaya and C.L. Wiseman. *Comment on: A Validated Mathematical Model of Cell-Mediated Immune Response to Tumor Growth*, Cancer Research, **67**, No. 17, (2007), 8420.

L.G. de Pillis, D. Mallett and A. E. Radunskaya. *Spatial Tumor-Immune Modeling*, Computational and Mathematical Methods in Medicine, **7**, No. 2–3, (2006), 159–176.

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[10]Pomona College '06

L.G. de Pillis and A.E. Radunskaya. *Some Promising Approaches to Tumor-Immune Modeling*, in Mathematical Studies on Human Disease Dynamics: Emerging Paradigms and Challenges, AMS Contemporary Mathematics Series, (2006).

L.G. de Pillis, W. Gu and A.E. Radunskaya. *Mixed Immunotherapy and Chemotherapy of Tumors: Modeling Applications and Biological Interpretations*, Journal of Theoretical Biology, **238**, September, (2005) 841–862.

L.G. de PIllis, A.E. Radunskaya and C.L. Wiseman. *A Validated Mathematical Model of Cell-Mediated Immune Response to Tumor Growth*, Cancer Research, **65**, September, (2005) 7950-7958.

A.E. Radunskaya and M. Villasana. *A delay differential equation model for tumor growth*, J.Math.Biol. **47**, (2003), 270-294.

L.G. de Pillis and A.E. Radunskaya. *A mathematical model of immune response to tumor invasion*, MIT Conference Proceedings, Conference on Computational Fluid and Solid Mechanics, Elsevier Science, June 17-20, (2003).

L.G. dePillis and A.E. Radunskaya. *The Dynamics of an Optimally Controlled Tumor Model: A Case Study*, Mathematical and Computer Modelling (Special Issues), **37**, No. 11, (2003), pp. 1221–1244.

L.G. de Pillis and A.E. Radunskaya. *A validated computer model of the cell-mediated responses to vaccine therapy of three tumor systems in the C57B/6 mouse*, Abstracts for the 17th Annual Scientific Meeting of the Society for Biological Therapy: November 7-10, 2002 La Jolla, California, Journal of Immunotherapy, **25**, No. 6, Nov/Dec. (2002),

L.G. de Pillis and A.E. Radunskaya. *A Mathematical Tumor Model with Immune Resistance and Drug Therapy: an Optimal Control Approach*, Journal of Theoretical Medicine, **3**, (2001), pp. 79–100,

L.G. de Pillis and A.E. Radunskaya. *The Multiple-Scale Wave Equation*, Mathl. Comput. Modelling , **28**, No. 12, pp 33-80 (1998)

A.E. Radunskaya, *Comparing Random and Deterministic Time Series*, Economic Theory, **4**, (1994), pp.765–774,

PUBLICATIONS: ACCEPTED.

Lisette de Pillis, Erica J. Graham, Kaitlyn Hood, Yanping Ma, Ami Radunskaya, and Julie Simons, *Injury-initiated clot formation under flow: a mathematical model with warfarin treatment*, IMA Volumes in Mathematics and Its Applications, Vol. 158, (2015),

Peter Hinow and Ami Radunskaya, *The Mathematics of Drug Delivery*, chapter in "Mathematical Modeling of Tumor-System Immune Dynamics" , A. Eladdadi, P. Kim and D. Mallett, (eds.), Springer Special Volume, (2015)

L.G. de PIllis and A.E. Radunskaya, *Modeling Tumor-Immune Dynamics*, chapter in "Mathematical Modeling of Tumor-System Immune Dynamics", A. Eladdadi, P. Kim and D. Mallett, (eds.), Springer Special Volume, (2015)

Lisette de Pillis, Amina Eladdadi and Ami Radunskaya, *Modeling Cancer-Immune Responses to Therapy*, Journal of Pharmacokinetics and Pharmacodynamics, (2014),

ONLINE PUBLICATIONS

L.G. de Pillis and A.E. Radunskaya. *Mathematical Modeling and Scientific Computing: Learning Modules*, KUCSEC project, *Modeling Tumor-Immune Interactions*, available online: http://www.capital.edu/acad/as/csac/Keck/modules.html.

L.G. de Pillis and A.E. Radunskaya. *Mathematical Modeling and Scientific Computing: Learning Modules*, KUCSEC project, *Fourier Transforms, Fourier Series, and the FFT*, available online: http://www.capital.edu/acad/as/csac/Keck/modules.html.

TECHNICAL REPORTS AND PROCEEDINGS, NEWSLETTER ARTICLES - NON-PEER-REVIEWED.

A.E. Radunskaya *EDGE at NC State: Enhancing Diversity in Graduate Education* NC State Alumni Newsletter (2010), `http://www.math.ncsu.edu/Alumni/Nov2010newsletter/Nov2010.php`.

A.E. Radunskaya. *It's about time*, Op. Ed., *The Claremont Student*, December, (2004).

E. Buchla [11], B. Crabtree and A.E. Radunskaya. *A Real-Time Implementation of the non-linear FPU String Model*, abstract only, *Proceedings of the 2003 "Capire la Musica" Conference*, December, (2003).

A.E. Radunskaya. *A Small Set of Strategies for Increasing Diversity in Graduate Programs in Mathematics*, MER Newsletter, **15**, No. 3, (2003).

L.G. de Pilllis and A.E. Radunskaya. *A Model of Tumor Growth with Optimal Control*, Technical Report, *Argonne Labs* , (2000).

A.E. Radunskaya. *Practical Tests for Dynamical Invariants*, Technical Report, *Institute of the Exchange of Scientific Information*, Torino, Italy, (1997).

A.E. Radunskaya. *Chaos and Nonlinear Models*, ICMC Proceedings, Hong-Kong, (1996).

A.E. Radunskaya. *Computer Aided Control Line Encoding*, Technical Report, *AT & T Bell Labs*, (1985).

RECORDINGS AND FILM SCORES[12]

1. *A Childs Guide to Einstein,* by Toulouse Englehart, produced by Chris Darrow, 2003, ('cellist).

2. *The Harem Girl,* by Chris Darrow and Max Buda. TAXIM records, 1999, ('cellist).

3. *Esh,* original film score by A. Radunskaya, film directed and produced by Daphne Lapidot, (composer, performer, sound production).

4. *A Wild and Reckless Place,* by A. Radunskaya, in "The Virtuoso in the Computer Age", series by Centaur Records, ('cellist and composer).

5. *A Precipice in Time,* by David Rosenboom, Centaur Records, ('cellist).

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[11]Cal Arts, '04
[12]Contributions to project listed in parentheses

6. *Voodoo Cricket,* directed by Phill Sawyer and A. Radunskaya for Prime Time Science, (composer, producer, performer).

7. *Regarding the Shoe* original film score by A. Radunskaya, film directed and produced by Hilary Radner, (composer, performer, sound production).

8. *Works of Robert Erickson* , the Arch Ensemble, conducted by R. Hughes, CRI records, ('cellist).

9. *Works of Dallapiccola*, the Arch Ensemble, conducted by R. Hughes, 1750 Arch Records, ('cellist).

10. *The Ship of Death,* by Peter Lopez, performed by the Arch Ensemble, conducted by R. Hughes, 1750 Arch Records, ('cellist).

PH.D. STUDENTS, GRADUATE SUPERVISION, AND UNDERGRADUATE RESEARCH SUPERVISION

- Recent Undergraduate Research Supervision: Stephen Ragain (PO'14) *Modeling the effect of angiogenesis and macrophage phenotype on glioma growth.* Supported by a grant from the HHMI. Kevin Guttenplan (PO'14) *Understanding axonal growth: understanding chemotactic signals.* Pomona College independent study. Liz Sarapata (HMC'13) and Ted Zwang (PO'11): *A simple and rapid method for determining the binding affinity of ligands to immobilized protein surfaces using a quartz crystal microbalance.* Supported by the REBMI program with funding from the NSF. Sophia Yang (PO'11): *Parallelizing Sphere Packing Algorithms.* Sam Antill (PO 13): *A Mathematical Model of Tumor Growth to Investigate the Existence of a Critical Distance for Metastasis* (funded by a SURP grant from Pomona College). Ryan Handoko (Brown 13): *Motivating the Ratio-dependent kill rate of tumor cells by cytolytic T cells (CTL)*, Megan Hunter (PO 10): *Uncertainty Analysis of Parameter Estimates in a Delayed Differential Equation Model of the Immune Response. A delay-equation model of Dendritic Cell immunotherapy for cancer.* Students: Megan Hunter (Pomona College), Chris deBoever (Harvey Mudd College) and Helen Wu (Harvey Mudd College). Co-supervised with Prof. dePillis (Harvey Mudd College). Students were supported by grants from Pomona College and Harvey Mudd College.

- Ph.D. thesis supervision: Aisha Najera. Claremont Graduate University: *Predicting Fetal Distress.* Ms. Najera successfully advanced to Ph.D. candidacy and defended her proposal on December 10, 2012.

- Clinic supervision: *SPRAWL: Simulation of Population Redistribution using Agglomeration, Wages and Labor.* A hybrid cellular-automaton model predicting the growth and distribution of population and industry in Southern California over the next 50 years. Client: Southern California Edison, through the Claremont Graduate University, (2004).

- Clinic supervision: *Grid Instabilities from Wind Turbine Generators.* An analysis of non-linear instabilities in power production by large clusters of Wind Turbines in Southern California. Client: Southern California Edison, through the Claremont Graduate University, (2002).

- Ph.D. thesis supervision: Minaya Villasana, Claremont Graduate University: *A delay differential model of cancer tumor growth*, Ph.D. awarded May, 2001.

- Clinic supervision: *Chaos in the Power Grid*. A dynamical systems analysis of potential causes of voltage collapse in the southwestern power grid. Client: Shafer Corporation. Analysis of non-linear instabilities in the southwestern power grid. Co-sponsored by the Claremont Graduate University (1998).

- Served on the thesis committees of Diana Verzi, Ph.D. 2002, and Katya Fedorchuk, Ph.D. 2005, both in the mathematics department of the Claremont Graduate University.

- External referee for the Ph.D. dissertation of Junko Murakami, Ph.D 2005, Arizona State University.

- Additionally, supervised 21 undergraduate research experiences and 36 senior theses at the Claremont Colleges. Results of this undergraduate research have been presented at 8 conferences.

PROFESSIONAL MEMBERSHIPS

AWM (Association of Women in Mathematics)
SIAM (Society for Industrial and Applied Mathematics)
AMS (American Mathematical Society)
MAA (Mathematical Association of America)
SMB (Society for Mathematical Biology)
SACNAS (Society for the Advancement of Chicano and Native American Scientists)
Project Next.
EMF (Electronic Music Foundation).