

# DIVYA E. VERNEREY (née Devadoss)

(updated January 2021)

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## EDUCATION:

- Ph.D., Engineering Sciences and Applied Mathematics, June 2004  
Northwestern University, Evanston, IL  
Dissertation research: "Mathematical Modeling of Polymerization Waves"  
Committee: Vladimir A. Volpert (chair), David Chopp, Alvin Bayliss
- M.S., Department of Mathematics, June 1998  
Northwestern University, Evanston, IL
- B.S., Summa Cum Laude, June 1995  
North Central College, Naperville, IL  
Majors: Mathematics and Computer Science; minor: Chemistry

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## ACADEMIC EMPLOYMENT:

- Senior Instructor, August 2019 –  
Department of Mathematics  
University of Colorado, Boulder, CO
- Instructor, January 2014 - June 2019  
Department of Mathematics  
University of Colorado, Boulder, CO
- Lecturer, August 2007- December 2013  
Department of Mathematics  
University of Colorado, Boulder, CO
- Lecturer, September 2006 – June 2007  
Department of Engineering Sciences and Applied Mathematics  
Northwestern University, Evanston, IL
- Assistant Professor, August 2004 – May 2006

### FELLOWSHIPS AND AWARDS:

- Fall 2018, Marinus Smith Award, "The purpose of this award is to identify and recognize CU Boulder faculty, staff, coaches, and administrators who have made a significant impact on the lives of CU Boulder students."
  - Fall 2017, Marinus Smith Award, "The purpose of this award is to identify and recognize CU Boulder faculty, staff, coaches, and administrators who have made a significant impact on the lives of CU Boulder students."
  - Henry C. Welcome Fellowships from Maryland Higher Education Commission. \$20,000, duration 2004 – 2007.
  - Section NExT Fellow, Mathematical Association of America, MD-DC-VA section, 2004-2006.
  - NSF travel grant to attend the Canadian-American-Mexican (CAM) APS Graduate Student Conference, Merida, Mexico, October 2003.
  - Research/Teaching Assistantship and Full Tuition Fellowship, Department of Engineering Sciences and Applied Mathematics, Northwestern University, 1999 - 2004.
  - Teaching Assistantship and Full Tuition Fellowship, Department of Mathematics, Northwestern University, 1995 - 1998.
  - Presidential Scholarship (full tuition), North Central College, 1991-1995.
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### COURSES TAUGHT:

1. History of Mathematical Ideas (MATH 4820/5820), undergraduate and graduate class, UCB, Spring 2021 (remote).  
Suggested textbooks: J. Stillwell, Mathematics and Its History, 3<sup>rd</sup> edition, Springer, 2010.  
Technology: Canvas, LaTeX required.
2. Partial Differential Equations (MATH 4470/5470), undergraduate and graduate class, UCB, Spring 2014, Spring 2015, Fall 2015.  
Suggested textbooks: E.C. Zachmanoglou and D.W. Thoe, Introduction to Partial Differential Equations with Applications, 2<sup>nd</sup> edition, Dover, 1986 and K. Gustafson, Introduction to Partial Differential Equations and Hilbert Space Methods, 3<sup>rd</sup> edition, revised, Dover, 1999.  
Technology: Mathematica, D2L, LaTeX required.

3. Operations Research (MATH/APPM 4120/5120), undergraduate and graduate class, Spring 2018, Spring 2020 (Covid).  
Textbook: Luenberger and Lu, Linear and Nonlinear Programming, 3<sup>rd</sup> edition, 2008.  
Technology: MS Excel, Matlab, LaTeX, Canvas required.
4. Intermediate Numerical Analysis I (MATH/APPM 4650), UCB, Spring 2016, Spring 2017, Spring 2019, Spring 2021 (remote).  
Textbook: (Required:) R.L. Burden and J. D. Faires, Numerical Analysis, 9th Edition, Brooks-Cole, 2010. (Suggested:) S.J. Chapman, Essentials of MATLAB Programming, 2nd Edition, Wadsworth, 2008.  
Technology: MATLAB, D2L/Canvas, LaTeX required.
5. Ordinary Differential Equations (MATH 3430), UCB, Fall 2014, Fall 2017, Fall 2018, Summer 2018, Fall 2019, Spring 2020 (Covid), Summer 2020 (remote), Fall 2020 (remote).  
Textbook: M. Braun, Differential Equations and Their Applications, 4<sup>th</sup> edition, Springer, 1991.  
Technology: Mathematica, D2L/Canvas, LaTeX required.
6. Introduction to Linear Algebra (MATH 3130), UCB, Fall 2014, Fall 2008.  
Textbook: D. Lay, Linear Algebra and its Applications, 4<sup>th</sup> edition, Addison-Wesley, 2012.  
Technology: D2L.
7. Seminar in Guided Mathematics Instruction (MATH 3850), UCB, Spring 2019, Fall 2018, Spring 2018, Fall 2017, Spring 2017, Fall 2016.
8. Introduction to Statistics (MATH 2510), UCB, Spring 2008.  
Textbook: McClave and Sincich, Statistics, 10<sup>th</sup> edition, Pearson.  
Technology: scientific calculator.
9. Calculus I: Differential Calculus (MATH 1300), sections including Honors RAP, UCB, Spring 2014, Spring 2009, Fall 2008, Spring 2008, Fall 2007.  
Textbook: Hughes-Hallett, Gleason, et al., Calculus, 5<sup>th</sup> edition, Wiley, 2009.  
Technology: WebWork, D2L.
10. Data and Models (MATH 1212), UCB, mostly for Psychology majors, Spring 2019, Fall 2019, Fall 2020.  
Textbook: J. Lehmann, A Pathway to Introductory Statistics, 1<sup>st</sup> edition, Pearson, 2016.  
Technology: TI-84 graphing calculator, Pearson's MyLabMath integrated into Canvas.
11. Precalculus (MATH 1150), UCB, redesigned small sections: Fall 2018, Spring 2018, Fall 2017, Spring 2017, Fall 2016, Spring 2016. Graduate TAs and Undergraduate LAs.  
Textbook: S. Axler, Precalculus: A Prelude to Calculus, 2<sup>th</sup> edition, Wiley, 2012 and Custom CoursePack (written by D. Vernerey and used since Fall 2017)  
Technology: WebAssign, D2L, impose no calculator.
12. Precalculus (MATH 1150), UCB, large section: Spring 2016; Fall 2015, Spring 2015, Fall 2014, Spring 2014, Fall 2009. Graduate TAs.

Textbook: M. Dugopolski, Precalculus: Functions and Graphs, 4<sup>th</sup> edition, Pearson, 2013.  
Technology: WebWork, Clickers, D2L, impose no calculator.

13. Math Analysis in Business (MATH 1112), UCB, Fall 2015, Spring 2015.  
Textbook: none (pedagogy of flipped classroom with group work on modules)  
Technology: EXCEL, D2L.
14. Calculus for Social Science and Business (MATH 1081), UCB, Spring 2013.  
Textbook: Lial, Greenwell and Ritchey, Calculus with Applications, 10<sup>th</sup> edition, Pearson, 2012.  
Technology: MyMathLab, Clickers, D2L.
15. Finite Mathematics (MATH 1071), sections including Libby RAP, UCB, Fall 2013, Fall 2012.  
Textbook: Lial, Hungerford, Holcomb, Finite Mathematics with Applications, 10<sup>th</sup> edition, Pearson.  
Technology: MyMathLab, Clickers, D2L.
16. Quantitative Reasoning and Math Skills (MATH 1012), UCB, Spring 2010.  
Textbook: Bennett and Briggs, Using and Understanding Mathematics: A Quantitative Reasoning Approach, 4<sup>th</sup> edition, Pearson, 2008.
17. College Algebra (MATH 1011), UCB, Spring 2012, Fall 2011, Fall 2010, Spring 2008.  
Textbook: Young, College Algebra, 1<sup>st</sup> edition, Wiley, 2006.  
Technology: CULearn (online homework and class website), Clickers.
18. Multivariable Calculus and Vector Analysis: Calculus III (MATH 234), Northwestern University, Fall 2006, Winter 2007, Spring 2007.  
Textbook: Edwards and Penney, Multivariable Calculus, 6<sup>th</sup> edition, Prentice Hall.
19. Numerical Methods (MATH 471/571), undergraduate and graduate class, Salisbury University, 2006,  
Textbook: Faires and Burden, Numerical Methods, 3<sup>rd</sup> edition, Thomson, 2003.  
Technology: MAPLE.
20. Mathematical Models and Applications (MATH 465/565), undergraduate and graduate class, Salisbury University, 2007.  
Textbook: Maki and Thompson, Mathematical Modeling and Computer Simulation, Thomson, 2006.
21. Ordinary Differential Equations and Applications (MATH 311), Salisbury University, Spring 2005.  
Textbook: Nagle, Saff and Snider, Fundamentals of Differential Equations, 6<sup>th</sup> edition, Pearson, 2004.  
Technology: MAPLE.
22. Calculus I; Differential Calculus (MATH 201), Salisbury University, Fall 2005, Fall 2004.  
Textbook: Stewart, Calculus: Early Transcendentals, 5<sup>th</sup> edition, Brooks, 2003.

Technology: MAPLE.

23. Introduction to Applied Calculus (MATH 160), Salisbury University.  
Textbook: Tan, Applied Calculus for the Managerial, Life and Social Sciences, 8<sup>th</sup> edition, Brooks-Cole.
24. Teaching Assistant, Northwestern University: Differential, Integral and Multivariate Calculus courses, Engineering Analysis sequence (statics and dynamics), Linear Algebra, Ordinary Differential Equations.  
Note: Consistently received some of the highest student evaluations throughout all courses and hence assigned as Lead TA for several sections.  
Technology: MAPLE, MATLAB.

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### **UNDERGRADUATE RESEARCH:**

- Khaled Allen, CAS Honors Student, Summa cum laude, honors thesis "An Exploration of Quantum Game Theory and its Applications," November 2020.
- Max Howard, Internal Math REU, Theory of Support Vector Machines versus Ordinary Least Square, Summer 2020.
- Wei Qi, Internal Math REU, Theory of Support Vector Machines versus Ordinary Least Square, Summer 2020.
- Adam Sanchez, Internal Math REU, Theory of Support Vector Machines versus Ordinary Least Square, Summer 2020.
- Jonathan Powell, Undergraduate Independent Study (MATH 4900), Study of Regression Models: OLS versus SVM using R programming, UCB, Fall 2019.
- Sarah Liddle, Internal Math REU, Numerical Solutions of PDEs: airplane wing simulation, UROP partially-funded, UCB, Summer 2017.
- Qi Pei, Internal Math REU, Numerical Solutions of PDEs: airplane wing simulation, UROP partially-funded, UCB, Summer 2017.
- Tyler Wettstein, Internal Math REU, Numerical Solutions of PDEs: airplane wing simulation, UROP partially-funded, UCB, Summer 2017.
- Elizabeth Parsons, Wavelet Analysis in Digital Signal Processing (DSP), Graduate Independent Study (MATH 6900), Spring 2016.
- Thomas Bisbee, Internal Math REU, Numerical Solutions of PDEs, UROP partially-funded, UCB, Summer 2015.
- Eliot Kersgaard, Internal Math REU, Numerical Solutions of PDEs, UROP partially-funded, UCB, Summer 2015.

- Dalton Jones, Undergraduate Independent Study (MATH 4900), Theory of Reaction-Diffusion Equations, UCB, Fall 2014.
- Julia Young, Undergraduate Independent Study (MATH 4900), Numerical Analysis of Reaction-Diffusion Equations, UCB, Fall 2014.

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### **PROFESSIONAL SERVICE ACTIVITIES:**

- Director of Undergraduate Research (DUR), Fall 2019 –
  - Compiling list of contacts with local industries (Google) and alumni for student internships
  - Working with Computer Committee (P. Mayr) to maintain a web presence for undergraduate research; took core training class for WebCentral (Oct 2019)
  - Starting an Instagram account, and continue Facebook account to communicate undergraduate research opportunities to students; brainstorm to publish monthly undergraduate Math flyer
  - Continuing to integrate MathClub with talks about internal summer research and graduate school info panel
  - Registered to have MAA departmental membership (currently about 75 students enrolled), September 2019 -
  - Chaperoned 11 students to JMM 2020 in Denver to present Student Poster Session followed by dinner
  - Volunteering to be Rocky Mountain MAA student activities coordinator, Fall 2019 - (sent information to RM for Spring2020 newsletter, get books for Jeopardy math contest prizes, etc.)
  - Member of Council on Undergraduate Research (CUR) to get funds to support undergraduate research
  - Sponsored by CUR, to send students to National Conferences on Undergraduate Research (NCUR)
  - Send out bimonthly emails to QED Math Club members on listserv regarding research opportunities in MURE (math undergrad research experience):
    - Summer internal REU/G
    - Experimental Math Lab
    - National NSF REUs
  - Existing Math Department membership paid by undergraduate student fees: AMS, MSRI, AWM, Rocky Mountain Consortium
  - Worked on report on Math placement algorithm of incoming first-year students. Compared Support Vector Machines versus Ordinary Least Square on raw data, Summer 2020.
  - Started contact in July 2020 with CU volunteer resource center for underprivileged students hit by Covid pandemic. Start volunteer program with Girls Inc of Metro Denver (GIMD), non-profit helping mostly Latinx, lower-income, single-family girls in K-12 schools; elementary and high school STEM tutoring with about 15 CU Math undergraduate students in January 2021.

- Member of Committee to update Math Constitution (chair K. Kearnes), help rewrite portion relating to Instructors, Fall 2019 – Spring 2020.
- Induct undergraduates into Pi Mu Epsilon (PME), National Math Honors Society, for math majors and minor with high Math GPA, and hold Spring induction ceremony: Spring 2017, 2018, 2019, 2020 (remote), 2021 (remote).
- Re-write and submitted (with Sean O’Rourke and Kyle Luh) new course proposal for Math undergraduates on Data Science, Fall 2021.
- Member of PUEC (chaired by J. Englander) for Al Bronstein, November 2020.
- Member of PUEC (chaired by J. Englander) for Kevin Manley (correct CV, teaching and service statements), November 2019.
- In committee (chair N. Thiem) to hire (successful search: H. Stalvey) new Instructor, March 2019.
- Organized Mesa Brownie Scouts to visit CU for talk on 3D printing: Introduction to Materials, January 2019.
- Attended Disability Service’s program to understand the new FLEX plan (flexibility for attendance and assignment deadlines) for DS students, January 2019.
- Compiled customized CoursePack (written by D. Vernerey) for Precalculus , Spring 2020, Fall 2019, Spring 2019, Fall 2018, Spring 2018, Fall 2017, Fall 2020 (pdf), Spring 2021 (pdf).
- Compiled custom CoursePack for MATH 1212 (Data and Models) using work of Joe Timmer and Dee Dee Shaulis, Fall 2018, Spring 2019, Fall 2019, Spring 2020, Fall 2020 (pdf), Spring 2021 (pdf).
- Compiled custom CoursePack for MATH 2510 (Introduction to Statistics) using work of Joe Timmer and Dee Dee Shaulis, Spring 2020.
- First Year Math Committee (chair R. Tubbs), formulate duties of Course Coordinators, and such issues, Spring 2019, Fall 2018.
- Undergraduate Committee (upper-division) member, UCB. N. Thiem (chair), Fall 2014, Spring 2015, Fall 2019, Spring 2020, Fall 2020, Fall 2021. Tasks involved about 3 classroom visits (per semester) of fellow faculty for teaching portfolio, proposal protocol for Special Topics Math4810, textbook search for 1000-, 2000- level course, compiling

Learning Goals for 1000-, 2000- level courses, get list of speaker for bi-yearly (April and October) Math Undergraduate Lecturers.

- Attended all Calculus Faculty Learning Committee (FLC) meetings (chaired by J. Timmer and L. Roberson) to focus on the calculus sequence and ways to improve it, Fall 2019, Spring 2020.
- Attended Canvas Training program run by OIT (platform change from D2L), April 2018.
- Attended FTEP: What are your students learning, January 2018.
- Teaching Quality Framework Math team, with chair N. Thiem, to improve and redesign FCQs, Spring 2018, Fall 2017.
- Member of committee to revamp Math Placement Exams for incoming freshman, Spring 2018.
- Member of reappointment committee for Dr. Albert Bronstein (chair N. Theim), Fall 2018.
- Member of ad-hoc Committee of Coordinators to discuss how to effectively manage the coordination of several small lectures (chair F.T. Liu) Spring 2018, Fall 2017.
- Mandatory reporting/bystander training workshop, Mathematics Department, UCB, April 2018.
- Co-wrote and submitted (with Sean O'Rourke) new course proposal for Math undergraduates on Big Data Science, Fall 2017.
- QED: Math Club faculty co-mentor, Fall 2015 – current. Six times per semester have faculty speakers for undergraduate students (with free pizza and drinks); make posters. Sought to have link on math department website, started math club mailing list; led Pi-day and career day (to discuss graduate school, actuarial studies certificate).
- For our undergraduates declared as Math majors, had 200 t-shirts/totes designed and made for Math Club in 2017-2018 (Fibonacci Spiral), 2018-2019 (Peano/Hilbert Curve), 2019-2020 (Escher Tessellations).
- Undergraduate Committee member, UCB. J. Clelland (chair) Fall 2015 – Spring 2017; Fall 2014, N. Thiem (chair), Spring 2015. Tasks involved observing fellow faculty for teaching portfolio, writing learning goals for courses, evaluate requisites. Work with UCB Data Analytics to determine placement for students (as ALEKS exam extinct).
- Coordinator for Precalculus (MATH 1150) from Spring 2016 – Spring 2018:
  - Unify all small sections. Duties included standardize LaTeX beamer notes with faux 2 clicker questions per day, choose daily WebWork assignments, compose weekly



- teamwork Tuesday projects, and about 25 in-class active learning activities, and quizzes, compile weekly written homework list, install common D2L page for all sections with news feed, gradebook, and contents. UCB, Spring 2018, Fall 2017, Spring 2017, Fall 2016, Spring 2016, Fall 2015, Spring 2015, Fall 2014.
- Weekly meetings with undergraduate learning assistants (SIGMI). Separate meeting with graduate TAs and instructors.
  - Attended OIT workshop on integrating clickers into large lectures, 2009.
  - Attended FTEP workshop on learning goals and course design, August 2015. Discussed Bloom's taxonomy.
  - In Fall 2015 redesigned large lecture precalculus to become small lectures and incorporate active learning. Spring 2016 saw pilot class.
  - Attended PreCalculus and Calculus Innovation Workshop to discuss, in particular, active-learning, online homework systems and open educational resources, Northwestern University, Evanston, IL, November 2015.
  - Attended IBL workshop, UCB, Boulder, CO, August 2016.
  - Attended 42<sup>nd</sup> AMATYC Annual Conference to learn about math education terminology and practices, Denver, CO, November 2016.
  - Attended International Learning Assistant Conference, UCB, November 2017.
- Coordinator for Data and Models (MATH 1212) from Spring 2019, Fall 2019, Fall 2020:
    - Duties included posting on Canvas for all sections with news feed, gradebook, and contents. Has integrated MyMathLab online homeworks within Canvas, write weekly quizzes with group, install common Canvas page for all sections. UCB.
    - Weekly meetings with undergraduate learning assistants (SIGMI). Separate meeting with instructors.
  - Had about 50 t-shirts designed and made for CU Math Alumni and Friends (AfterMath), Fall 2017
  - Initiated a Math subject exam GRE preparatory class for undergraduates. Met weekly for a problem solving session with 4 students, Summer 2017, Summer 2016, Summer 2015.
  - Received Graduate Faculty Membership and hence was a member of Dalton Jones' M.S. thesis committee, "On Synchronization in Networks of Coupled Oscillators", Spring 2015.

- Mentoring Committee member (C. Farsi, chair), UCB, Spring 2014. Tasks involved discussing formal system for mentoring faculty, in particular, the mentor/protégé duties.
- Summer Internal REU (pilot program) Committee member (N. Thiem, chair), UCB, Spring 2014. Tasks included discuss faculty participation, student recruitment, graduate student vertical integration.
- Help proctor Analysis preliminary exam for graduate students, UCB, August 2014.
- Computer Committee member, UCB, 2009. Helped set-up WebWork for the Department of Mathematics Calculus series with CU's OIT.
- Mathematics Faculty Search committee member, Salisbury University, 2006. Duties involved review and selection of applicants, organization of interviews and recommendation to department.
- Faculty advisor for Student MCM-ICM mathematical modeling group, Salisbury University, 2005. Advised two groups of three students in preparation for national mathematical modeling competition.
- Judge in undergraduate student poster/talk at local AMS conferences, Salisbury University, 2004.
- Faculty co-advisor to Math Club, Salisbury University, 2004-2006. Monthly meetings with Math majors to publish undergraduate flyer with Math Problem of the Month and the like.
- Offered Math GRE preparatory sessions for undergraduates, Salisbury University, 2005-2006.

#### **RESEARCH INTERESTS:**

- Partial differential equations, specifically, systems of nonlinear reaction-diffusion equations, mathematical modeling using both analytical and computational methods.
- Expansion of mathematics, physics, and chemistry to develop mathematical models of the frontal polymerization process.
- Mathematical biology, in particular, tissue engineering and tissue growth, which can lead to propagation of degradation fronts.

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#### **PUBLICATIONS:**

- Devadoss, D. E., Pojman, J. A.; Volpert, V. A. "Mathematical Modeling of Thiol-Ene Frontal Polymerization," *Chem. Eng. Sci.* **2006**, *61*, 1257-1271.

- Devadoss, D. E., Volpert, V. A. "Mathematical Modeling of Radially Propagating Polymerization Waves with the Gel Effect," *Applied Math. and Computation*. **2006**, 172, 1036-1053.
- Devadoss, D. E., Volpert, V. A. "Modeling Isothermal Free-Radical Frontal Polymerization with Gel Effect Using Free Volume Theory, with and without Inhibition," *J. Mathematical Chem.* **2006**, 39, 73-104.
- Devadoss, D. E., Volpert, V.A. "Mathematical Modeling of Polymerization Waves" **2004** (thesis).

## PRESENTATIONS:

- Vernerey, D., QED: CU Math Club, Viscous Fingering (Saffman-Taylor instability with pattern formation), April 18, 2018.
- Vernerey, D., Machen, R., & Stalvey, H. E. (2017). Developing an active learning environment in precalculus. Special session on Active Learning in Undergraduate Mathematics, AMS spring southeastern sectional meeting. Charleston, SC, March 10–12, 2017.
- Vernerey, D., Stalvey, H., & Machen, R. Advisor Day, A Collaboration Between Faculty and Student Affairs and the Results; SASC/MATH regarding Precalculus, February 14, 2017.
- Invited Department Seminar, Department of Applied Mathematics, University of Colorado, Boulder, *Nonlinear Reaction-Diffusion Equations*, 2007.
- Invited Department Colloquium, Augsburg College, Minneapolis, MN, *Mathematical Modeling of Frontal Polymerization with Encapsulated Initiators*, 2007.
- AMS- SIAM Joint Meeting, New Orleans, LA, *Frontal Polymerization*, January 2006.
- MAA Meeting; Baltimore, MD; *Polymerization Waves*, November 2004.
- *Mathematics: At the Front of Good Chemistry*; The Eastern Shore High School Competition; Salisbury University, Salisbury, MD, November 2004.
- Invited Department Colloquium, North Park University, Chicago, IL, *Mathematical Modeling of Isothermal Frontal Polymerization*. 2004.

- AMS-SIAM Joint Meeting, Phoenix, AZ, *Mathematical Modeling of Frontal Polymerization*, January 2004.
- APS, CAM Graduate Student Physics Meeting, Meridia, Mexico, October 2003.
- *Metric Spaces*; ACCA Student Research Symposium, Wheaton College, Wheaton, IL, October 1993