Barbara Kaskosz

CURRICULUM VITAE

Education: Ph.D. in Mathematics, 1977, Institute of Mathematics of the Polish
Academy of Sciences, Warsaw, Poland

M.S. in Mathematics, 1973, University of Warsaw, Poland

Employment History:

2023-Present: Chair of the Mathematics Department, University of Rhode
Island

1994-Present: Professor, tenured. Promoted to Full Professor III in 2005
University of Rhode Island, Department of Mathematics

1987-1994:   Associate Professor, tenured,
University of Rhode Island, Department of Mathematics

1984-1987:   Assistant Professor,
University of Rhode Island, Department of Mathematics

1982-1984:   Visiting Assistant Professor,
University of Rhode Island, Department of Mathematics

1979-1982:   Assistant Professor,
Institute of Mathematics of the Polish Academy of Sciences,
Warsaw, Poland

1977-1979:   Senior Research Assistant,
Institute of Mathematics of the Polish Academy of Sciences,
Warsaw, Poland

1974-1977:   Ph.D. student,
Institute of Mathematics of the Polish Academy of Sciences,
Warsaw, Poland

1973-1974:   Research Assistant
Institute of Mathematics of the Polish Academy of Sciences,
Warsaw, Poland

Grants:

Co-Principal Investigator on the grant: National Science Foundation Award: NSF DUE-1140299, for the project: *Mobile Math Apps*.
Award amount: $174,226.-
Award duration: January 1, 2012 – January 1, 2016.
Principal Investigator: Douglas Ensley, Shippensburg University, PA.

Principal Investigator on the grant: National Science Foundation Award: NSF DUE-0535327 for the project: *Tools and Training for Developers of Mathematics and Science Teaching Materials in Flash*.
Award Amount: $137,163.-. Award Duration: Jan 1, 2006 – June 30, 2008.
Awarded to the University of Rhode Island on September 27, 2005. Co-PI: Douglas Ensley, Shippensburg University PA.

Awarded $2,910.- from the Office of the Vice Provost for Graduate Studies, Research, and Outreach for the project: *Exploration of the Server-Side Functionality of the Flash Platform.* Duration: July 1, 2006- July 1, 2008.

Principal Investigator on the grant: Rhode Island Board of Governors for Higher Education 1999-2000 Incentive Fund for Excellence in Technology grant for the project *Technology and Mathematics: Computer Algebra Systems and the Web*.
Amount of Award: $36,000.-

Grantee on the grant: Rhode Island Board of Governors for Higher Education 2000-2001 Incentive Fund for Excellence in Technology grant for the project *ProCalc -- Technology to Enchance Precalculus and Calculus* .
Amount of Award: $37,500.-

Co-Principal Investigator on the grant: Rhode Island Board of Governors for Higher Education 2001-2002 Incentive Fund for Excellence in Technology grant for the project *ProCalc -- A Key Step Toward Web-Based Learning.* Amount of Award: $29,000.-

Co-Principal Investigator on the grant: URI Foundation 2002 Competitive Grant for the project *Video Mini Lectures for Web-Based Tutorials in Mathematics.*
Amount of Award: $1,973.-

Principal Investigator on the grant: National Science Foundation Award: NSF DMS-8601774 for the project: *Differential Inclusions and Generalized Control Systems*, duration June 1986-November 1988.
Amount of Award: $26,380.

Awards:

FlashAndMath.com project that included the www.flashandmath.com website and the book <u>Flash and Math Applets: Learn by Example </u>by Doug Ensley and Barbara Kaskosz was honored by the International Conference on Technology in Collegiate Mathematics (ICTCM) with the ***2009 ICTCM Award for Excellence and Innovation with the Use of Technology in Collegiate Mathematics***.

The collection of my mathematics applets, *Flash Mathlets*, was awarded the ***MERLOT Award for Exemplary Online Learning Resources - MERLOT Classics 2009.*** MERLOT, Multimedia Educational Resource for Learning and Online Teaching, is a prestigious collection of online teaching materials.

Polish Mathematical Society Award for Young Mathematicians, 1978

Conferences, Workshops, Courses, Fellowships:

26th International Conference on Technology in Collegiate Mathematics (ICTCM), San Antonio, TX, March 20-23, 2014. Presentation: *Mobile Math Apps: Hands On Demo and Assessment Results* (with Doug Ensley).

2014 Joint Mathematics Meetings (JMM), January 15-18, 2014, Baltimore, MD. Presentation: *Mobile Delivery vs. Paper and Pencil: A Comparison of Student Learning* to be presented at the *MAA Session on Teaching with Technology: Impact, Evaluation, and Reflection* (with Doug Ensley).

The NSF-sponsored project *Mobile Math Apps* was included (by invitation) in the NSF Division of Undergraduate Education Awards in the Mathematical Sciences Poster Session at the 2014 Joint Mathematics Meetings, (JMM), January 15-18, 2014, Baltimore, MD.

Co-presented an invited talk at the AMS Invited Session on *The Present and Future of Mathematics on the Web* at the Joint Mathematics Meetings (JMM), San Diego, CA, January 9 - 12, 2013. Talk, joint with Doug Ensley, titled *Mobile Math Apps: The Smartphone Paradigm*

Participated in the Poster Session of Projects Supported by the NSF Division of Undergraduate Education at the Joint Mathematics Meetings (JMM), San Diego, CA, January 9 - 12, 2013.

Presented a talk, joint with Doug Ensley and Lea Adams, *Mobile Math Apps: Assessing Innovative Technologies for the Smartphone* at the International Conference on Technology in Collegiate Mathematics (ICTCM), Boston, MA, March 21 - 24, 2013.

Showcased *Mobile Math Apps* – smartphone learning modules – at the University of Rhode Island Technology Symposium, March 20, 2013, Kingston, RI.

Participated as an invited panelist to the Panel: *Teaching Mathematics with the New Tablets: iPads, Slates, and Smartphones*, MathFest 2011, Lexington, Kentucky, August 4-6, 2011.

Invited by the Mathematical Association of America (MAA) and participated in three online meetings and an in-person workshop in Washington, DC, September 17-19, 2010. (All expenses paid by the MAA.) The purpose of the workshop was to select and evaluate online resources for Calculus that became a part of a new division within the MAA, *Course Communities*, in the *Programs* category.

21st International Conference on Technology in Collegiate Mathematics (ICTCM), New Orleans, LA, March 13-15, 2009. (Invited).

National Science Foundation CCLI Principal Investigators Conference, Washington DC, August 13 -15, 2008. (Invited).

PREP Workshop: *Flash in the Valley -- Creating Mathlets with Adobe Flash*, June 9 -13, 2008, Shippensburg University, PA. Co-organizer and presenter. Workshop was sponsored by the National Science Foundation and the Mathematical Association of America (MAA) under its Professional Enhancement Programs (PREP).

Joint Mathematics Meetings, San Diego, CA, January 6-9, 2008. Joint talk "Steal This Applet!" with Doug Ensley. Invited panelist in a panel discussion: *Dueling Platforms: Java vs. Flash.*

MAA and NSF sponsored workshop: *Better Practices for Math on the Web*, Washington DC, July 15 - 21, 2007. (Invited.)

NSF sponsored workshop: *Enhancing the problem authoring capabilties of WeBWorK*, August 6 -August 10, 2007, Palo Alto, California. (Invited.)

PREP Workshop: *Flash at the Beach -- Creating Mathlets with Adobe Flash*, June 11 - 15, 2007, University of Rhode Island. Co-organizer and presenter. Workshop was sponsored by the National Science Foundation and the Mathematical Association of America under its Professional Enhancement Programs (PREP).

The 19th Annual International Conference on Technology in Collegiate Mathematics (ICTCM), February 15-18, 2007, Boston, MA. Jointly with Doug Ensley, conducted a computer mincourse: *Flash programming for creating mathlets*.

Joint Mathematics Meetings, New Orleans, January 5-8, 2007. Together with Doug Ensley conducts a minicourse: *Creating visual mathematics applets using Flash programming*.

The 18th Annual International Conference on Technology in Collegiate Mathematics, (ICTCM), March 16-19, 2006, Orlando, Florida. Together with Douglas Ensley conducted a computer minicourse: *Tools and training for developing mathematics teaching materials in Flash.*

Joint Mathematics Meetings, San Antonio Texas, January 12-15, 2006. Presented a talk: *Flash as a tool for creating calculus and analysis mathlets.*

Mathematical Theory of Networks and Systems, St. Louis, Missouri, June 1996.

Third SIAM Conference on Control and Applications, St. Louis, Missouri, April 1995.

Control Theory in the 90'ties, San Francisco, California, May 1989.

International Federation on Automatic Control (IFAC) Workshop on Dynamical Systems and Differential Games, Sochi, Russia, 1980.

The 9th International Federation on Information Processing (IFIP) Conference on Optimization Techniques, Warsaw, Poland, 1979.

Invited speaker for the 18th IFIP Conference on System Modelling and Optimization, Detroit, Michigan, July 1997.

Invited speaker for the 25th IEEE Conference on Decision and Control, Athens, Greece, December 1986.

Invited for Workshop on Parametric and Nonsmooth Optimization, Montreal, Canada, February 1986.

Invited speaker for the Conference on Trends and Theory and Practice of Nonlinear Analysis, Arlington, Texas, June 1984.

Chaired a session on control theory at the Annual Meeting of the American Mathematical Society, Louisville, Kentucky, January 1984.

Invited speaker for an hour talk at Optimization Session of Summer Meeting of Canadian Mathematical Society, Vancouver, Canada, June 1983.

1980, The Second International Semester on Optimal Control, Banach Center, Warsaw, Poland.

1977, Two month fellowship, Steklov Mathematical Institute of Russian Academy of Sciences, Moscow, Russia.

1974, Three month school on control theory and functional analysis, International Center for Theoretical Physics, Trieste, Italy.

1973, The First International Semester on Optimal Control, Banach Center, Warsaw, Poland.

Conference Program Committees:

A member of the Program Committee for the International Conference on Technology in Collegiate Mathematics (ICTCM), in 2006, 2007, 2008, 2009, and 2010.

Referee, Reviewer:

Referreed many articles among others for:

SIAM Journal on Control and Optimization
Journal of Optimization Theory and Applications
Banach Center Publications
System and Control Letters
Journal of Mathematical Analysis and Applications

Research Interests:

Analytical methods in combinatorics.

Mathematical undergraduate education.

Optimal control theory, especially nonsmooth control systems and differential inclusions.

Recent Workshops and Pedagogical Developments

In Spring 2018 participated in Phase I Assessment of the General Education Program run by the Office of Innovation in General Education at URI. As part of participation attended an Assessment Academy and data tool information session, submitted rubric assessment results for 10 students.

In Summer 2018 completed Online Pedagogy Competency Courses offered by the University of Rhode Island, Online Education, A Division of the Office for the Advancement of Teaching & Learning.

Summer 2019: A member of the URI team for The Rhode Island Teaching and Learning Network Course Design Institute - an intensive workshop on learner-centered course design. Providence RI, June 3-7, 2019.

In Fall 2018 developed a proposal for MTH 243 Multivariable Calculus Online version. The proposal was approved.

Refereed Publications[1]

1. Lower bounds for integral functionals generated by bipartite graphs, (with Lubos Thoma), *Czechoslovak Mathematical Journal*, 69, (2019) pp. 571-592.

2. The Beauty of Parametric Curves, *Loci Resources*, (2008).

3. Motion in 3D Space, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2008).

4. Simple 3D Drawing, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2007).

5. Flash Tools for Developers: 3D Graphers in ActionScript 3, (with Doug Ensley), *MAA MathDL Digital Classroom Resources,* (2007).

6. ActionScript 3 Tutorials, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2007).

7. Flash Tools for Developers (AS3): Graphing Curves on the Plane, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2007).

8. Visualizing Regions for Double Integrals, (with Lewis Pakula), *MathDL Digital Classroom Resources*, (2006).

9. Flash Tools for Developers: Matching Formulas to Data, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2006).

10. Flash Tools for Developers: Truth Tables and Logic, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2006).

11. Flash Tools for Developers: 3D Function Grapher, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2006).

12. Flash Tools for Developers: Parametric Curves on the Plane, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2006).

13. Flash Tools for Developers: Function Grapher, (with Doug Ensley), *MathDL Digital Classroom Resources*, (2005).

14. A Collection of Tools for Multivariable Calculus, *MathDL Digital Classroom Resources*, (2005).

15. Sequences and Series of Functions, *Journal of Online Mathematics and Its Applications*, 5, (2005).

16. Sequences and Series Plotter, *Journal of Online Mathematics and Its Application*s, 5, (2005).

17. 3D Function Grapher, *MathDL Digital Classroom Resources,* (2005).

18. Accumulated Change and Antiderivative Plotter, *Journal of Online Mathematics and Its Applications*, 4, (2004).

19. Derivative Plotter, *Journal of Online Mathematics and Its Applications*, 4, (2004).

20. Families and Points Plotter, *MathDL Digital Classroom Resources*, (2004).

21. Functions Grapher, *MathDL Digital Classroom Resources*, (2004).

22. Extremality, controllability and abundant subsets of generalized control systems, *Journal of Optimization Theory and Applications*, 101, (1999), pp. 73-108.

23. Abundant subsets of generalized control systems, in Systems Modelling and Optimization, edited by M.P.Polis, A.L.Dontchev, P.Kall, I.Lasiecka, A.Olbrot, Volume 396 in the Chapman&Hall/CRC Research Notes in Mathematics, (1999).

24. Lagrange-type extremal trajectories in differential inclusions, (with S. Lojasiewicz, Jr.), *Systems and Control Letters*, 19, (1992), pp. 241-247.

25. Boundary trajectories of systems with unbounded controls, (with S. Lojasiewicz, Jr.), *Journal of Optimization Theory and Applications*, 70, (1991), pp. 539-559.

26. A maximum principle in relaxed controls, *Nonlinear Analysis*, 14, (1990), pp. 357- 367.

27. The maximum principle without the adjoint equation, (with S. Lojasiewicz, Jr.), *Systems and Control Letters*, 12, (1989), pp. 455-459.

28. Minimal trajectories of nonconvex differential inclusions, (with H. Frankowska), *Journal of Optimization Theory and Applications*, 61, (1989), pp. 359-376.

29. A maximum principle for differential inclusion problems with state constraints, (with H. Frankowska), *Systems and Control Letters*, 11, (1988), pp. 189-194.

30. On a nonsmooth, nonconvex control system, (with S. Lojasiewicz, Jr.), *Journal of Mathematical Analysis and Applications*, 136, (1988), pp. 39-53.

31. Linearization and boundary trajectories of nonsmooth control systems, (with H. Frankowska), *Canadian Journal of Mathematics*, 15, (1988), pp. 589-609.

32. Nonconvex control systems and differential inclusions, in Proceedings of the 25th Conference on Decision and Control, (1986), pp. 1980-1985.

33. Optimal trajectories of generalized control systems with state constraints, *Nonlinear Analysis*, 10, (1986), pp. 1105-1121.

34. Boundary trajectories of generalized control systems, in Trends in Theory and Practice of Nonlinear Analysis, edited by V. Lakshmikantham, Elsevier Sc. Publ., (1985), pp. 201-206.

35. A maximum principle for generalized control systems, (with S. Lojasiewicz, Jr.), *Nonlinear Analysis*, 9, (1985), pp. 109-130.

36. A differential game of evasion with delays, (with T. Tadumadze), *Journal of Optimization Theory and Applications*, 44, (1984), pp. 231-268.

37. Necessary conditions for a minimax control problem, *Control and Cybernetics*, 11, (1982), pp. 29-40.

38. Realizability of Volterra series with constant kernels, (with B. Jakubczyk), *Nonlinear Analysis*, 5, (1981), pp. 167-183.

39. Realizations of Volterra series, (with B. Jakubczyk), *Lecture Notes in Control and Information Science*, Springer-Verlag, Volume 22, (1980), pp. 302-310.

40. A sufficient condition for evasion in a nonlinear game I, *Control and Cybernetics*, 7, (1978), pp. 5-15.

41. A sufficient condition for evasion in a nonlinear game II, *Control and Cybernetics*, 7, (1978), pp. 39-50.

42. On a nonlinear evasion problem, *SIAM Journal of Control and Optimization*, 15, (1977), pp. 661-673.

Other Publications

In preparation: "Applied Precalculus Applets" - a set of web-based interactive applets programmed in JavaScript and HTML5. The collection is designed as a companion to the open-access textbook "Applied Precalculus" by E. Denette and B. Kaskosz.

Trigonometry Tutor, (with Doug Ensley), *Google Play,* (2016). An interactive educational app. Posted under developer name *MobileMathApps*. Developed under our grant NSF DUE-1140299. (As of September 2017, over 5,000 downloads. Rating: 4.6 out of 5.)

Logarthm/Exponential Tutor, (with Doug Ensley), *Google Play,* (2016). An interactive educational app. Posted under developer name *MobileMathApps*. Developed under our grant NSF DUE-1140299. (As of September 2017, over 1,000 downloads. Rating: 3.8 out of 5.)

Mobile Math Apps: Innovative Smartphone Technology, (with Doug Ensley), *Proceedings of the 25th International Conference on Technology in Collegiate Mathematics (ICTCM),* (2013).

Steal This Applet! (with Doug Ensley), *Proceedings of the 20th International Conference on Technology in Collegiate Mathematics (ICTCM),* (2009).

New 3D Methods of Display Objects in Flash Player 10, (with Doug Ensley), *Flash and Flex Developer's Magazine*, Vol 2, issue 3, (2009), pp. 78-82.

Books

Applied Precalculus, (with Erin Denette), an open access, free, online textbook written for the URI MTH 103 Applied Precalculus course, (2020), 270 pages[2].

Flash and Math Applets: Learn by Example, (with Doug Ensley), SurgeBook Publishing, (2009), 326 pages.

[1]*All publications listed above were published with authors listed in alphabetical order.*

[2]*The book was launched in Fall 2020 as our new textbook for MTH 103 Applied Precalculus. The book is written with MTH 103 in mind and it closely fits the course's needs and spirit. The book is accompanied by homework sets prepared by the authors within the free online homework system WeBWorK.*