# Joseph Kolibal

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## University Education

*1986 – 1990* *Oxford University* *D.Phil., Mathematics (numerical analysis), 1990*

Research for doctorate is on the numerical solution of hyperbolic partial differential equations, especially in regard to the analysis of numerical methods with applications in computational fluid dynamics.

- Dissertation: *Aspects of the Finite Volume Method for Compressible Flows.* Doctoral supervisor: Prof. K. W. Morton. The research was supported through a research assistantship provided by R.A.E. Farnborough.

The studies leading to the M.Sc. qualifier focused on nonlinear elliptic partial differential equations, functional analysis and free and moving boundary problems.

- The M.Sc. qualifying dissertation: *Solutions of a Nonlinear Elliptic Boundary Value Problem with a Discontinuous Nonlinearity.* Supervisor: Dr. J. Norbury.

*1980 – 1986* *Princeton University* *Continuing education*

Completed the core undergraduate mathematics curriculum taking courses in Honors multi-variable calculus, introduction to analysis, real analysis I & II, complex analysis I & II, topology I & II, odes, abstract algebra, and numerical analysis.

*1979 – 1979* *Courant Institute, New York University* *Continuing education*

Completed course in advanced calculus.

*1975 – 1977* *Imperial College, Univ. of London* *M.Sc., D.I.C., Nuclear Engineering, 1977*

Concentration in reactor physics and control. Research on radiation transport and computational solution methods.

- Thesis: *Variance Reduction in Monte-Carlo by Removal of the Spatial Components.* Supervisor: Dr. J. Woods.

*1970 – 1974* *Carnegie-Mellon University* *B.S. Chemical Engineering, 1974*

Undergraduate research on coatings and paints with PPG Industries under Dr. Dent. Worked at Arco Polymer (Sinclair-Koppers) during summer 1973 for junior engineering experience.

## Last Position

*2012 — 2018* *University of New Haven* *Professor, Mathematics*

*Teaching*:

- Retired Summer 2018. Tenured professor in the Department of Mathematics and Physics. Teach undergraduate classes in mathematics, having taught 26 classes since Fall 2012 at UNH.

*Administrative*:

- Chair, Department of Mathematics and Physics, July 2013 – 2017.
  Restructured Department of Mathematics to integrate the Physics Program into a coordinated Department of Mathematics and Physics.
- Chair, Department of Mathematics, August 2012 – June 2012.

## Previous Academic Experience

*1993 – 2012* *University of Southern Mississippi* *Associate Professor, Mathematics*

*Administrative*:

- Interim-Chair January 2011 – June 2012; Assistant chair, Fall 2008 – 2010.
- Graduate Program Coordinator for PhD and MS program Fall 2007 – 2010.
- Coordinator for the College of Science and Technology's interdisciplinary Scientific Computing Program, August 2002 to May 2004; Responsible for operation, outreach and interfacing with department chairs.

*Academic*:

- Taught over 100 classes from Fall of 1993 to Spring of 2012 at USM, supporting teaching from elementary mathematics through the MS in mathematics to the doctoral programs in Scientific Computing (SC), and later in the restructured Ph.D. in Applied and Computational Mathematics Program offered since 2005 through the Department as part of the College's Computational Science Program (COS).
- Tenured and promoted Fall, 1999 in the Mathematics Department.

*2000 — 2012* *Other University Teaching Experience* *Associate Professor, Mathematics*

*Academic*:

- Taught undergraduate course on Approximation at Linyi University, PRC, Fall 2010, and graduate mini-course on partial differential equations at Linyi University, Spring 2011.
- Invited to teach in the International Summer School at Korea University, summer 2008; selected as a Visiting Scholar at Korea University, Seoul, South Korea, Summer of 2007.
- Taught four week graduate mini-course in Numerical Methods at Nanjing University for Aeronautics and Astronautics, Nanjing, PRC, June 2002.

*1991 – 1993* *University of Florida* *Visiting Assistant Professor, Mechanical Engineering*

Visiting position from August 1991 to May 1993:

Taught numerical analysis, engineering and computational mathematics at the graduate level at the Center for Advanced Studies in Engineering, West Palm Beach Campus. These classes were done jointly with UF, Gainesville. Supported industrially sponsored research at the Center for Advanced Studies in Engineering in combustion modeling.

*1987 – 1989* *Oxford University* *Tutor/Teaching Assistant*

Tutored undergraduates in mathematics at Oxford University (six trimesters for St. Hilda's College). Computer lab teaching (one trimester) at the Oxford University Computing Laboratory.

## Industrial/Research Experience

*2006 – 2008* *QinetiQ, PLC* *Consultant*

Worked on developing signal analysis and lossy compression algorithms, primarily for image data using stochastic approximation and interpolation methods.

*2002 – 2003* *Synergetic Technologies, Inc.* *Consultant*

Developed mathematical models and software for support of scattering analysis associated with nanoparticle spectral analysis.

*1993* *University of Florida* *Consultant*

Research contract for the computation of fluid dynamics modeling of flue gas effluent and combustion efficiency of waste incineration.

*1990 – 1991* *Pratt and Whitney* *Senior Engineer, CFD Group*

Supported effort in three-dimensional Navier-Stokes studies of rotating machinery (engine compressor design), assessing computational fluid dynamics (CFD) software, methods and mesh generation, and assisting in the integration of computational techniques into engineering design.

Worked on two-phase flow modeling and aircraft compressor computational fluid dynamics. Responsible for assessing alternative computational methods for future development or acquisition by the CFD group.

*1987* *Princeton Plasma Physics Laboratory* *Consultant*

Three month DOE consulting contract for analytic and software development doing transient analysis simulation of the vacuum pumping system for the Tokamak Fusion Test Reactor (TFTR).

*1980 – 1986* *Princeton Plasma Physics Laboratory* *Technical Staff, Radiation Analysis Group*

Computational neutronics analyst for TFTR. Performed large-scale computational fusion neutronics engineering analysis and research.

Worked in the Radiation Analysis Group, responsible for assessing and predicting operational and shut-

down radiation fields of the Tokamak Fusion Test Reactor during Deuterium-Deuterium and Deuterium-Tritium pulse testing. Developed off site dose dispersion and tritium effluent models and assessments, and nucleonics software for parametric studies.

*1977 – 1980* *Ebasco Services, Incorporated* *Nuclear Engineer, Applied Physics Department*

Supported computational radiation analysis and design of radiation monitoring systems for nuclear power plant design.

*1974 – 1975* *Dravo Corporation* *Chemical Engineer, ChemPlants Division*

Engineered process flow measurement and control for chemical plant design.

## Computational and technical background

*Systems*

Extensive experience on Unix/Linux platforms, including system installation, software customization and support, and administration. Responsible for the development of a computational mathematics laboratory used by computational science graduate students and faculty in the Department of Mathematics at USM, and most recently implemented the Department's Linux network and computational server in the Department of Mathematics at UNH.

Developed and support the Standard Desktop (SD) for installing a customized Mate/Compiz based user desktop on a standard Ubuntu 16.04 installation, along with the automated install of a large suite of scientific and computational software and user scripts suitable for research and teaching. Available at http://math.newhaven.edu/kolibal/downloads/u16.04_html/.

Faculty adviser to the USM Linux Users Group (student organization) from 1999 to 2009.

*Scientific Computing*

Experienced with large radiation transport codes including Monte Carlo and discrete ordinates methods; large computational fluid dynamics codes using finite difference, finite volume, and finite element methods; and, mesh generation. Experienced with image file formats and compression tools for image file manipulation.

Comprehensive experience in large scale computing and high performance computing environments, particularly in support of industrial and engineering models. These include developing, using and modifying nuclear radiation transport and analysis codes, computational fluid dynamics codes, as well as developing software for post-processing and analysis.

*Programming Skills*

Program in Fortran, C, and Python with extensive knowledge of scripting languages, bash, zsh, awk, and sed. Limited experience with perl and C++.

Experienced with symbolic algebraic tools Maple, Mathematica, Matlab, and mathematical software libraries for computer graphics and linear algebra. Write computer software for testing numerical and computational algorithms for research and industrial applications, and for teaching numerical and computational classes at the undergraduate and graduate levels.

Extensive knowledge of TeX and LaTeX and electronic publication developing style files and templates for conferences, proceedings, and texts, including the undergraduate Honors Thesis, and graduate thesis and dissertation templates used by the Graduate School at USM, and most recently the undergraduate Honors Thesis templates at UNH along with the SURF Report and presentation templates. Supported the Departmental web services and educational outreach, along with developing programs for distance learning at USM.

# Accomplishments at the University of New Haven

*The Department of Mathematics and Physics at UNH consists of 16 full time (tenured, tenure track, or non-tenure track) faculty, 7 full time adjunct faculty, and about 24 part-time adjunct faculty. The department serves about 32 undergraduate math majors and supports a large service role teaching about 100 math and about 30 physics sections each semester. These service courses range from developmental mathematics courses through introductory masters level courses in mathematics. The Department also has a large number of about one hundred physics and mathematics minors.*

## Administrative accomplishments at UNH

*Highlights*

Assumed responsibility for the Department of Mathematics operations Fall, 2012, and for the Department of Mathematics and Physics in Summer 2013:

1. Undertook several major curriculum initiatives to update the Mathematics degree programs, including a proposal to introduce a new degree program at the Masters level in Applied and Computational Mathematics.

2. Added new service courses to better support the engineering program, the business program, and, added or modified several math courses to improve the math curriculum for Math BA and BS majors along with reforming several existing math classes to align the curriculum with existing standards.

3. Integrated the Physics Program into the Department of Mathematics to develop a coordinated Department of Mathematics and Physics in Spring 2013.

4. Supervised update of the Physics Labs (Summer 2013) to significantly upgrade the lab facility.

5. Proposed and received approval in Spring 2013 to develop and implement the Math Zone, UNH's emporium-style developmental mathematics learning center.

*Pedagogy & Curriculum*

Improved Departmental effectiveness from the remedial and entry levels through the introduction of new approaches for teaching, and introduced curriculum reform throughout the mathematics curriculum. Supported the University's development of assessment based learning outcomes.

Spring 2017 – Fall 2017 curriculum accomplishments:

1. Instroduced updated BA and BS programs of study designed to improve the quality of the BS Math degree, and to increasing the accessibility of the BA Math degree to students interested in a double major in math, http://math.newhaven.edu/index.html/curriculum_html/docs/ProgramGuide.html.

Spring 2016 – Fall 2016 curriculum accomplishments:

1. Restructured the mathematics and physics core to support the University's two level core requirements.

2. Developed standardized curriculum for all departmental service courses and developed online digital resources at http://math.newhaven.edu/mathphysics/curriculum_html/catalog.html.

Spring 2015 – Fall 2015 curriculum accomplishments:

1. Coordinated the restructuring of the Mathematics BA and BS programs. This represents a significant effort to streamline, modernize and improve the quality of the undergraduate mathematics program as a precursor for introducing an applied mathematics and computational science MS degree. This substantial program change involves modifying about 20% of current courses, as well as strengthening the program requirements for the Math BA and BS degrees by moving it toward a stronger undergraduate research oriented stance for the BS and developing a more flexible Math BA program for double majors.

2. Supported introduction of new course, PHYS 1115 *The Physics of Sports* and PHYS 1116 (Lab) to provide Sports Management majors a more appropriate non-calculus based physics core course.

Fall 2013 – Fall 2014 curriculum accomplishments:

1. Modified the curriculum for MATH 3303 *Advanced Calculus*, bringing it in line with a vector calculus/introduction to basic concepts in analysis. This fills a gap in the curriculum and is of benefit to math majors, minors, and engineering students.

2. Developed new course, MATH 3310 Introduction to Partial Differential Equations based on examining classical solution methods for PDEs in two independent variables. This is designed to follow MATH 2204 *Differential Equations* or MATH 2205 *Differential Equations with Linear Algebra*.

3. Developed new course, MATH 1121 *Foundations of Mathematics* built on discrete math and emphasizing methods of proof. Required of all math majors in their second semester, affording them an opportunity to take mathematics courses earlier.

4. Developed new course, MATH 1104 *Quantitative Reasoning*, as part of the University mathematics core for non-technical majors. The curriculum provides an alternative to the traditional algebra based core math course options. Instead the curriculum is built around logic, reasoning, and problem solving focusing on enumeration, counting arguments and probability.

Fall 2012 – Spring 2013 curriculum accomplishments:

1. Introduced a new combined MATH 2205, *Differential Equations with Linear Algebra*, to better meet the needs of engineering students.

2. Revamped MATH 3301 *Modern Geometry* to provide students in the Mathematics BA program an NCATE/NCTM compliant introductory course in geometry.

3. Completely revamped the teaching of developmental mathematics by introducing a self-paced and adaptive emporium-based teaching model.

   This included putting together the administrative framework, the technology (in coordination with Pearson and Knewton), and the curriculum (through Summer 2013) for MATH 1103 *Fundamental Math*, MATH 1108 *College Math*, MATH 1110 *College Algebra*, and MATH 1115 *Pre-Calculus*. This was a turnkey project designed to overhaul the teaching of developmental mathematics at UNH using mastery based learning.

The objectives of these curriculum reform initiatives were to strengthen the undergraduate mathematics curriculum for UNH math majors and minors, the service curriculum for engineering and science, and

the developmental mathematics curriculum; to improve efficiency; to provide a more consistent learning environment, and to increase the success and retention rates for STEM students.

*Personnel* Over the last five years at UNH, have directly supervised or assisted in the hiring of 5 tenure-track faculty and 5 lecturers to replace retiring or departing faculty, and have filled two visiting assistant professor positions to replace faculty on sabbatical leave. This has provided an opportunity to rebuild the Department. This also involves a fairly substantial assessment effort for newly hired tenure track faculty, as well as the task of working with faculty in phased retirement at UNH.

*Technology* Completely reworked and updated the framework of the administration of the Department, moving to an electronic records-keeping database on arriving at UNH.

1. Worked with IT to develop and maintain web based in-house math placement exams for all incoming students to the University of New Haven (UNH). Developed the question database for the placement exam, the scoring rubric, and the assessment software. The new placement exam was coupled with a program of post-testing assessment for outliers that has been an effective placement tool over the last five years.

2. Developed and maintained online Departmental web pages for current news, faculty and student accomplishements and events at http://math.newhaven.edu, and updated the content and scope of the University's online content regarding the Department.

3. Implemented in-house computer based technology based on Linux to support faculty and students, substantially improving support for computational science in the Department.

## Teaching accomplishments at UNH

*New or reworked classes*

Spring 2015, reworked curriculum for MATH 3338, *Numerical Analysis* to provide an introduction to Python based programming, while supporting Octave and Matlab programming options.

Piloted teaching of MATH 1104 Quantitative Reasoning using a Lecture/Recitation approach. The course was introduced in the Spring 2015 semester as a math core course providing an alternative to the traditional algebra based curriculum for students in the arts and humanities.

*Undergrad classes taught*

Taught: MATH 1104 *Quantitative Reasoning*, MATH 1166 *Discrete Mathematics*, MATH 2204 *Differential Equations*, and MATH 3338 *Numerical Analysis*, MATH 3311 *Linear Algebra*. MATH 4492 *Seminar: Estimation, Approximation and Standard Inequalities*, MATH 1117 *Calculus I*, and MATH 1117 *Honors Calculus I*.

## Teaching aligned to research at UNH

*Student research*

Participated in SURF (Summer Undergraduate Research Fellowships) at UNH during Summer 2015. Supervised one student involved in an undergraduate research project at UNH during Spring 2013,, and completed supervision of one Ph.D. graduate student at USM (successfully defended PhD Dissertation, June 2013).

## Service accomplishments at UNH

*Department Search Committees*

Chaired two Math VAP search committees, Summer 2015. Chaired two Math tenure track search committees, Spring 2014. Chaired Physics NTT (Non-Tenure Track) search committee, Spring 2013; Chaired two Math NTT search committees, Spring 2013, and a member of one Math NTT search committee, Spring 2013.

*University Service*

Developed University-wide in-house Mathematics Placement exam for incoming students. The Mathematics Placement Exam was successfully used by over 1200 incoming freshmen students in Spring/Summer 2013, and has been used reliably since then for every incoming class each semester. The work involved the selection and coding of placement test questions for a three-tiered, online placement exam, and developing the assessment rubric and accompanying software.

## Funded activities at UNH

Awarded University mentorship of undergraduate SURF (Summer Undergraduate Research Fellowship) student involved in study of stochastic PDEs using fractional calculus. Summer 2015.

Awarded University IRC (Interdisciplinary Research Cluster) grant in Parallel Computing, Fall 2012 and in Fall 2013. Maintain parallel computational workstation for interdisciplinary faculty research. Renewed for 2013-2014.

## Grant activities at UNH

Co-PI of NSF grant proposal to seek support for UNH Conference on Fractional Calculus in Spring 2014. The proposal was not funded.

Participated in College-wide effort to seek support for the improvement of education and pedagogy through participation in an NSF Upward Bound proposal, Fall 2012. The proposal was not funded.

# Accomplishments at the University of Southern Mississippi

*The Department of Mathematics at USM has 16 graduate faculty and 6 instructors on two campuses with a budget of $225,000. The Department of Mathematics has 120 mathematics BS and Licensure BS majors, and 11 graduate students, and provides services courses from developmental mathematics (Intermediate Algebra) through to doctoral level graduate courses in applied mathematics. In addition, the Department operates a 120 seat emporium based teaching facility for about 2300 students each year for developmental and elementary mathematics, and teaches in aggregate about 3200 undergraduate and 32 graduate students each year.*

## Administrative accomplishments at USM, 2011 – 2012

*Admin-Office* Interim chair, January 2011 – 2012. Responsible for administering the Department and coordinating the interdisciplinary Computational Science Program.

*Pedagogy and Curriculum* Introduced undergraduate curriculum reform to strength the undergraduate Math BS program, adding an additional 18 credit hours to the mathematics courses required for graduation. Increased the number of graduate students supported in the MS and PhD program from 8 to 18, primarily by restructuring the funding of the Math Zone. Strengthened the continuous assessment process, particularly at the graduate level.

*Personnel* Increased the number of instructors in the Math Zone, and successfully hired two new instructors for the Fall of 2011. Hired three visiting assistant professors to fill vacencies in Mathematics Education, and in Mathematics (USM Gulf Coast) in 2010 and 2011. Hired two tenure track assistant professor positions. Successfully implemented a 5% salary and equity adjustment in 2011. Conducted 4 third year (pre-tenure) reviews, one tenure review, and two faculty promotions. Developed and received faculty approval of new faculty annual assessment reports.

*Technology* Introduced technology for online, remote classroom teaching between the Hattiesburg and Gulf Coast campuses. Initiated renovation of Department undergraduate and graduate computer labs, Spring 2012.

## Administrative accomplishments at USM, 2008 – 2011

*Admin-Office* Assistant chair, Fall 2008 – Fall 2010. Responsible for day-to-day departmental duties, attending college-wide administrative meetings in absence of chair, meeting visitors and arranging schedules, and meeting with students. Responsible for class scheduling and graduate program development, and for coordinating the assessment and accreditation requirements the graduate programs, i.e., MS in Mathematics and PhD in Computational Science.

*Technology* Responsible for development of computing resources, and for purchases of all technology related equipment. Developed student and staff support for computers and technology services, and for developed Department web pages, brochures and public announcements.

## Teaching accomplishments at USM

*New classes* Maintained a consistent effort to improve educational effectiveness at all levels including the teaching of over 14 new courses, and an effort to improve Departmental effectiveness at the remedial and entry levels through the introduction of new approaches for teaching.

*Introductory classes*

Developed alternative teaching approaches for MAT-101 College Algebra and MAT-103 Trigonometry. Taught classes using video feed, interactive video, and video taped lectures. Developed curricula for online courses (WebCT), and maintain active online web based curriculum support.

Active in improving the curriculum, including University supported summer improvement grants in education. In Spring 2009 worked on departmental committee to re-assess the College core, introducing MAT-100 Quantitative Analysis as an alternative to College Algebra for non-STEM majors.

### Teaching accomplishments at USM (continued)

*Undergrad classes*

Taught: MAT-101 College Algebra, MAT-103 Trigonometry, MAT-128 Pre-Calculus, MAT-167 Calculus I, MAT-168 Calculus II, MAT-169 Calculus III, MAT-314 Calculus for the Arts and Social Sciences, MAT-320 Probability I, MAT-321 Probability and Statistics II, MAT-326 Linear Algebra I, MAT-340 Discrete Math, MAT-415 Ordinary Differential Equations II, and MAT-417 Introduction to Partial Differential Equations.

*Upper level and masters classes*

Taught: MAT-423/523 Modern Algebra I, MAT-426/526 Linear Algebra II, MAT-460/560 Numerical Analysis I, MAT-461/561 Numerical Analysis II, MAT-441/541 Advanced Calculus I, MAT-442/542 Advanced Calculus II, MAT-689, Graduate Seminar I (Inequalities, Estimation and Approximation), and MAT-689 Graduate Seminar II (Convergence).

New topics courses introduced: MAT-492: Numerical Solution of PDEs, MAT-492: Iterative Solution of Linear Systems, MAT-592: Transport theory, MAT-682: Hilbert Space Theory, MAT-684: Matrix Analysis, MAT-684: Stochastic Matrices, MAT-685: Special Functions, and MAT-685: Numerical Approximation and Interpolation.

*Doctoral classes*

Taught: MAT-772 Mathematics I for Computational Science, SC-720 Mathematics I (Numerical Analysis for Scientific Computing), SC-721 Mathematics II (Numerical Solution of PDEs for Scientific Computing), SC-750 Computational Fluid Dynamics, SC 751 Introduction to the Finite Element Method, SC 740 Graduate Seminar for Scientific Computing, COS 702 Data Analysis Tools, COS 781 Numerical Linear Algebra for the Applied Sciences, and COS 781 Computational Methods for Radiation Analysis.

*Summer teaching*

Taught during the summer semesters from 1993 through 2010, primarily providing topics classes and research classes for graduate students.

### Teaching aligned to research at USM, 1991 – 2012

*Doctoral committees*

Participated in Ph.D. committees in Applied and Computational Mathematics and in Computational Science at USM. Served on 35 doctoral committees, of which 9 were as chair; of these 9 students 5 successfully completed the research and were awarded the Ph.D. in Scientific Computing. Served on 1 doctoral committee in Mathematics Education.

*Masters committees*

Served on 19 masters degree committees (thesis option), of which 10 were as chair; of these 10 student 9 completed the thesis successfully and were awarded the M.S and one earned the degree without completing the thesis option on the MS research. Masters committees include those in Scientific Computing, Mathematics, and Computer Science.

*Bachelors committees*

Served on 9 undergraduate research (thesis option, or project) committees of which 8 were as chair; of these 7 students all earned a BS with 4 of these successfully completing the research work.

## Teaching aligned to service at USM

*Student mentoring*

Summer 2011 worked with two AGEM undergraduate research students. Worked with AGEM and McNair Scholars Program from 1999 to 2012; participated in Dean's Student Mentor Program from 1996–2001.

Introduced and successfully chaired four High School Math Olympiads from 1998 to 2001 sponsored by NASA Space Grant Funds and USM.

## Service activities at USM

Actively supported Departmental governance and contributing extensively to the service needs of the Department and the College of Science and Technology, particularly in support of the doctoral program, computational mathematics, and computing technology support and outreach in education. Service highlights for the last five years include:

*Department*

Served on over 20 faculty search committees in the Department of Mathematics, in the Department of Computer Science, and in the Program in Scientific Computing, including: Graduate Coordinator, Fall 2007 – 2010, responsible for the MS and PhD graduate programs. Chair Graduate Program Committee. Chair mathematics faculty Search Committee, Spring 2009 for 2 candidates; Spring 2005 for 2 candidates. Member faculty Search Committees: Spring 2004 and 2002; member Graduate Program Committee, 2002–2006.

Graduate Computational Lab Coordinator, 2005–2010; and, Supervisor for the Computational Mathematics Laboratory, 2006–2010. Manage and administer the Department's network of 26 Linux workstations and servers, and supervise student computing systems support. Supervise Department web pages and documentation, 2002–2010;

*College*

Member of the College of Science and Technology Dean's Search Committee, Fall 2009. Computational Science Curriculum Committee, Fall 2005–2009. College By-Laws Committee, Fall 2003–Spring 2004; Department of Computer Science Gulf Coast Faculty Selection Committee, Fall 2003.

Coordinator for the Program in Scientific Computing (SC), 2002–2004, managing College-wide interdisciplinary doctoral program involving over 20 Ph.D. students at the Hattiesburg campus and at the Center for Higher Learning at NASA Stennis. Program involved about 35 doctoral students in the departments of Mathematics, Physics, and Computer Science.

*University*

Member of the University SOAR Software Standards Committee, Fall 2011 – 2012. Honors College faculty Samsung Tablet assessment committee, Fall 2011. Member of the University Priorities Committee, Spring 2010. Elected to Academic Council, Fall 2005–Spring 2006.

Developed and maintain the standard LaTeX dissertation and thesis templates approved by the Graduate School and used by the Scientific Computing Program, the Department of Mathematics, the Computational Science program within the College of Science and Technology, and the Honors College.

*Regional*

Serve on the Open Source Software Institute (OSSI) Advisory Committee, Fall 2003–2012;

Program Committee, Frontiers in the Convergence of Bioscience and Information Technologies, FBIT 2007. Vice-Chair of the Mathematics, Computer Science, and Statistics Section of the Mississippi Academy of Sciences, 2007–2008, and Chair from 2006–2007. Chair of committee on professional opportunities in mathematics, MAA Annual Meeting, April, 2005;

*Community* Member of the Board of Directors for the Sandstone Homeowners Association (HOA), 2000 – 2012. HOA president, 2000 – 2002.

### Patent activities at USM

Submitted preliminary patent application on stochastic interpolation: No. 20050203982 - Method and apparatus for approximating, deconvolving and interpolating data using Bernstein functions.

### Funded activities at USM

Awarded a total of $196,300 in grants of which $179,000 was in external funding. Applied for over 32 research grants, of which the following were funded:

- NRL Subcontract (Marine Sciences) for NCODA data analysis, $6500 Summer 2008.
- USM Faculty Grant for Improvement of Education, $3300 Summer 2008.
- USM Faculty Mentor Grant, $2500 Spring 2006.
- NSF Research Experience for Undergraduates (REU), $12,000 Fall 2002 - Spring 2003.
- USM Aubrey K. Lucas Grant, Developing Smooth non-Polynomial Interpolants, $5000 Summer 2002.
- Naval Research Laboratory (NRL), Assessment of Parallel Approximation in Ocean Modeling $5,240, Summer, 1998, Funded, Fall 1999.
- Awarded $22,000 for Thermochemistry Modeling Study, NASA, October 1997 to September, 1998.
- Awarded $11,000 for NASA-ASEE Faculty Fellowship, June to August, 1995.
- Awarded $22,000/year for 3 years for NASA Graduate Research Assistantship, August, 1994.
- Awarded $25,000 by NASA for SSME Diffuser Thermochemistry/CFD Modeling Study.
- Awarded $41,000 for seed-funding support for cavitation modeling for one year from NASA, 1995.
- Awarded $11,000 for NASA-ASEE Fellowship, June to August, 1994.

### Funded education grants at USM

Sought support for the improvement of education and pedagogy through ten grants submitted, including 6 major proposal (IGERT, ILI Instrumentation Grant, Eisenhower Grant, and two US DoEd FIPSE Grants). The following were funded:

- USM Summer Grant for the Improvement of Instruction, Development of Online, Interactive Calculus Text and Software, 1/3 Summer Semester support, 2008.
- USM Collaborative Technology Infusion Team Awards (PT3/CTI), $2500 to develop an interactive web site to teach and learn elementary statistics and probability concepts, Summer 2001.
- Summer Grants for the Improvement of Education, 1999. Internal grant support with 2/3 summer salary award.
- Pittsburgh Supercomputing Center, Spring, 1996. Obtained support for parallel computing research into two-phase flows on PSC Cray T3D.

# Teaching at other institutions

## Teaching abroad, 2000 – 2012

*Invited Courses*

Invited in November 2010 to teach a three week undergraduate mini-course, Approximation and Interpolation, and again invited in May of 2011 to teach a two week graduate mini-course, Numerical Solution of PDEs, at Linyi University.

Selected In 2007 to participate as a Visiting Scholar at Korea University, and provided a one semester course in Applied Mathematics during the summer semester. Invited in 2008 to teach two undergraduate engineering math classes at Korea University: an introductory class on numerical methods IEE-109 Numerical Analysis for Engineering, and IEE-108 Engineering Mathematics II. Invited during the summer of 2002 to teach a graduate level mini-course on Numerical Analysis at Nanjing University for Aeronautics and Engineering in Nanjing, China.

*University of Florida*

Prior to USM, taught over 10 courses in graduate engineering mathematics at the University of Florida, including courses in fluid dynamics, computational fluid dynamics, numerical analysis, engineering analysis, and heat transfer. Graduate courses taught at the Center for Advanced Studies in Engineering at the University of Florida included: EML-5710 Computational Fluid Dynamics, EML-6154 Conduction Heat Transfer, EML-6716 Advanced Fluid Dynamics, EML-6712 Advanced Computational Fluid Dynamics, EML-6934 Methods of Engineering Analysis, and EML-6934 Numerical Analysis,

# Presentations

Have given over 55 local, state, national and international presentations since 1991, including most recently:

- *Solving Differential Equations using Chebyshev Inner Products*, SIAM Annual Meeting, Boston, MA, July 12, 2016.
- *The Polynomial of a JSM Iteration*, MAA Northeastern Sectional Meeting, Portland, ME, June 4, 2016.
- *Fast Iterative Toeplitz Solver*, AMS Joint Meeting, Boston, January 7, 2012.
- *Efficient Stochastic Interpolation*, Department of Mathematics, University of Wisconsin-Milwaukee, Milwaukee, October 14, 2011.
- *Solutions of the Yang-Baxter Equation*, International Workshop on Optimization and Scientific Computing, Nanjing Normal University, Nanjing, May, 2011.
- *Interpolation using Stochastic Methods*, Korea University, Department of Electrical Engineering, July 25, 2008.
- *Stochastic Data Reconstruction*, International Conference on Computational and Experimental Engineering and Sciences, ICCES-2008, Honolulu, HI, March 16-22, 2008.
- *Interpolation a Review and a New View*, Korea University, Workshop at the Intelligent Signal Processing Laboratory, Department of Electrical Engineering, July 20, 2007.
- *Stochastic Data Reconstruction*, School of Computer Science and Engineering, Seoul National University, July 6, 2007.
- *Stochastic Data Reconstruction*, Seoul National University, Structural Complexity Laboratory, Department of Computer Science and Engineering, June 29, 2007.
- *The Use of Limiters in Stochastic Interpolation*, Mississippi Academy of Sciences Annual Meeting, Starkville, MS, February 21-23, 2007.
- *Driven Diffusion*, The Department of Physics, University of New Orleans, January 31, 2007.
- Tutorial session with D. Howard at the IEEE IIH-MSP 2006, the Second International Conference on Intelligent Information Hiding and Multimedia Signal, December 17-20, 2006, Pasadena, CA.

# Publications

### Current Work In-Progress

[1] E. Cenek and J. Kolibal, "Fast, iterative Toeplitz solvers,"

[2] J. Quinlan and J. Kolibal, "Chebyshev polynomials and ODEs,"

## Refereed Publications


[1] J. Quinlan and J. Kolibal, "Trigonometric integration without trigonometric functions," *Teaching Mathematics and Its Applications*, January 20 2016. doi: 10.1093/teamat/hrv020.

[2] J. K. A. Cibotarica, J. Ding and N. H. Rhee, "Solutions of the Yang-Baxter matrix equation for an idempotent," *Numerical Algebra, Control and Optimization*, vol. 3, no. 9, 2013.

[3] T. Jiang, Z. Jiang, and J. Kolibal, "A numerical method for one-dimensional time-dependent Schrödinger equation using radial basis functions," *International Journal of Computational Methods*, vol. 9, no. 4, 2012. DOI:10.1142/S0219876213410107.

[4] G. Yao, J. Kolibal, and C.S.Chen, "A localized approach for the method of approximate particular solutions," *Computers and Mathematics with Applications*, vol. 61, no. 9, pp. 2376–2387, 2011.

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