CURRICULUM VITAE

PERSONAL DETAILS

Name: Roger B. Sidje
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Position: Associate Dean (Aug 2013 - present), College of Arts and Sciences, The University of Alabama
Professor (Aug 2016 - present), Department of Mathematics, The University of Alabama

EDUCATION

My formal qualifications are in mathematics and computational science, with the following degrees:
1989: BSc Mathematics and Computer Science, University of Yaounde, Cameroon
1990: MCompSci, University of Yaounde, Cameroon
1994: PhD (Scientific Computing), University of Rennes 1, France. With the financial support of a joint project between INRIA (France) and NSF (USA). *Topic: Parallel algorithms for the computation of large-scale matrix exponentials – Application to the computation of transient distributions of Markov processes*. My PhD thesis was awarded High Honours ("Très Honorable") and is a bilingual document in French and English.

EMPLOYMENT

2020(Aug)–present: Associate Dean for Graduate Studies, College of Arts & Sciences, University of Alabama.
2013(Aug)–present: Associate Dean for Multicultural Affairs, College of Arts & Sciences, University of Alabama.
2016(Aug)–present: Professor, Department of Mathematics, University of Alabama.
2012(Aug)–2016(Aug): Associate Professor, Department of Mathematics, University of Alabama.
2008(Aug)–2012(Aug): Assistant Professor, Department of Mathematics, University of Alabama.
2008(Jan-Jul): Research Associate, Department of Computer Science & Engineering, University of Minnesota.
2000–2007: Research Fellow, ACMC/Department of Mathematics, UQ, Australia.
1994–2000: PostDoc/Research Officer, Department of Mathematics, University of Queensland, Australia.
1993–1994: Tutor, University of Rennes 1, France.

ADMINISTRATIVE EXPERIENCE

I serve since Fall 2020 as Associate Dean for Graduate Studies in the College of Arts and Sciences at the University of Alabama. In that role, my responsibilities include overseeing the College's graduate programs and initiatives, in line with our prominence as the flagship institution with R1-Very High Research status in the state of Alabama. Our College stands out by its largeness: 8000+ undergraduate students; 1000+ graduate students; 22 academic units/departments within 3 divisions that are: humanities and fine arts, social sciences, and natural sciences and mathematics. The College is home to 400+ tenured/tenure-track faculty; 150+ non-tenure full-time; 100+ non-tenure part-time.

I have also been serving since Fall 2013 as Associate Dean for Multicultural Affairs in the College. This is a role with Diversity, Equity & Inclusion (DEI) responsibilities that include: recruitment and retention of minority and underrepresented faculty; promotion of DEI efforts across all divisions of the College. This has involved delivering DEI training to over 200+ faculty search committees since 2015 and sharing the absorbed experience across our campus. I also had the stewardship of developing a Strategic Diversity Plan for our College.

As the chief DEI officer of the College, I have purposely sought to laterally engage in other dimensions that can reflect positively in the community and/or yield long-term returns of lasting benefit to the community at large. This sort of lateral approach at diversity has included supporting minority scholar entrepreneurs to provide services on our campus (e.g., consultant fees directed to minority provided workshops); or having our programs support underrepresented minority owned businesses (e.g., by having the advertisements of our faculty positions placed in minority owned publishing businesses such as Diversejobs.net, HACU.net, ...). Another manifestation of this lateral style: sponsoring minority organized conferences by regularly attending and purchasing exhibit booths at events such as ABRCMS, ERN, McKnight, SACNAS, SREB Institute of Teaching and Mentoring, etc. Or having a voice at minority focused meetings of corporations such as the AC&U's Conference on Diversity,

Equity, and Student Success. It takes some lateral thinking to recognize this sort of investments for which the returns may benefit the community at large, or the long-term payoffs credited to future generations.

I organized for many years the Graduate Recruiting Expo (GREX) where graduate students across the country were invited to the UA campus, with a special focus given to women and minorities in STEM disciplines.

I recently represented the College and the University at the international fronts in:

- Latin America (Brazil leg of the 2018 South American EducationUSA Fair Circuit – Rio De Janeiro, August 25 - 28, 2018; Sao Paolo, August 28 - September 2, 2018).
- Middle East (Q8 EduEx – Kuwait's International Higher Education Expo, Kuwait International Fairgrounds, Kuwait City, April 7-8, 2019; and The International Exhibition & Conference on Higher Education (IECHE), Riyadh International Convention & Exhibition Centre, Riyadh, Kingdom of Saudi Arabia, April 10-13, 2019).

I have also served as the College's Level One coordinator for the United Way Campaign that teamed up with UA campus partners to host the 2019 United Way campaign under the theme "The Art and Science of Giving", resulting in nearly $500K of donations, the highest giving for United Way in UA's history.

My position as an Associate Dean sets me as a member of UA's Council of Assistant and Associate Deans (CAAD), for which the duties are to advise the Office for Academic Affairs (OAA) on matters pertaining to academic policy and administration; and to serve as a channel for communication among the academic divisions and between the OAA and the various academic divisions.

RESEARCH AND TEACHING INTERESTS

My work in computational mathematics is well respected both in research and teaching. I have published more than 50 papers, including one that has 840+ citations per Google Scholar. I was nominated "Most Effective Teacher" at The University of Queensland in 2000 while I was in Australia. I joined The University of Alabama in Fall 2008, and soon after in 2011, the Chair of the Department of Mathematics at that time nominated me for the "College of Arts and Sciences Leadership Board Outstanding Commitment to Students Award". Most recently in 2020, the subsequent Chair of the Department of Mathematics also nominated me for the "Outstanding Graduate Mentor Award".

My main interests in computational mathematics blend theory and practice. I am moreover acquainted with important applications where my techniques prove useful. These include environmental modeling, computational engineering and computational biology. I believe this combination of interests characterizes a good numerical analyst. Aside from these works in computational mathematics, I have additionally developed a completely new expertise in technologies vital for mathematics education – as we move more and more towards an environment for course delivery fit for online and mobile devices. My particular areas of focus include:

- numerical methods and mathematical software in linear systems and eigenvalue problems, matrix exponentials, matrix functions and differential equations;
- applications in Markov chains, computational biology, computational engineering;
- scientific parallel computing;
- app and web engineering (e.g., tablet app, MathML) both in terms of research developments and uptake for education, such as the development of interactive components to make mathematics education more effective in today's digital age (e.g., I have developed MATLAB and MAPLE scripts that help students visualize concepts in a graphical, intuitive and animated manner).

RESEARCH EXPERTISE

I have broad skills in computational mathematics (development of new algorithms and theoretical analysis); web-based collaboration and mathematics education, and advanced computing. In the latter I am interested in the development of effective and robust methods both in the sequential and parallel contexts, with comparisons with alternative methods, and with these techniques ultimately used in contemporary applications arising from environmental modeling, computational engineering and computational biology. My research has often led to concrete outcomes of lasting benefit to end-users. Below are some of my outcomes in greater detail:

Markov chains and EXPOKIT: I developed the EXPOKIT package for small dense and large sparse matrix exponentials, with a particular regard to matrices arising in the transient distributions of Markov chains where probability constraints must be maintained. This work has been hailed as a significant contribution to the field, with the resulting paper gathering 840+ citations per Google Scholar, making it a highly cited and thus influential mathematical paper. As a further testimony of this, EXPOKIT has been embedded in a variety of applications (some commercial). In the opinion of Moler and Van Loan: *"*EXPOKIT *is the most extensive software for computing the matrix exponential"* (Siam Review, Vol. 45, No. 1, 2003). Prof. Cleve Moler is the creator of MATLAB and founder of MathWorks, Inc., while Prof. Charles Van Loan is a professor at Cornell and is co-author with the late Prof. Gene Golub of the seminal book "Matrix Computations". I also ported a parallel version of EXPOKIT in the framework of the Australian Partnership for Advanced Computing (APAC).

MathML: I was the initial developer of the MathML renderer that was integrated in all official releases of the Firefox web browser and distributed to the hundreds of millions of Firefox users around the world. I was featured in a cover story of *The Sydney Morning Herald* and *The (Melbourne) Age* on May 25, 2004, where the mainstream press branded me as "one of the quietest open source achievers in Australia". My work was also recognized through invitations (all expenses paid) at international conferences and meetings in Canada and the USA while I was in Australia, such as two invitations at the Firefox Engineering Summit in Mountain View, CA, USA (December 2005 and November 2006), and an invitation at the Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis (December 2006).

Eigenvalues: I have been involved in the development of Davdison-type methods for computing the outermost (i.e., largest or smallest) eigenvalues of large-scale egeinvalue problems and have performed comparisons with the Arnoldi-type methods of ARPACK (Sadkane & Sidje. Implementation of a variable-block Davidson method with deflation for solving large sparse eigenproblems. Numerical Algorithms Vol 20. 217-240, 1999). The resulting software was used by researchers in the UQ Department of Chemistry to tackle large-scale chemical problems.

Generalized cross validation (GCV): An important problem in Australia is the monitoring and modeling of the effects of the climate on agricultural areas, through computer programs that fit smoothing spline surfaces to meteorological data and then use this information in simulation programs. The GCV smoothing algorithm was used by the Queensland Department of Primary Industries (DPI) and the Queensland Department of Natural Resources (DNR) for interpolating weather data such as temperature or rainfall observations. However the GCV smoothing algorithm is a computationally intensive scheme that involves the minimization of an expensive function. By developing a new algorithm, dubbed *FastGCV*, based on iterative Lanczos methods, it was possible to dramatically reduce the execution time, allowing DPI and DNR to considerably speedup their environmental modeling of drought conditions. This work was done with local collaborators, Kevin Burrage, Alan Williams, and an overseas collaborator, Jocelyne Erhel (INRIA-France), as well as collaborators from DPI and DNR.

Krylov projection techniques, parallel computing, tensors, the chemical master equation: I have developed sequential and parallel Arnoldi methods (and variants based on Newton bases at Leja points), as well as parallel QR factorization algorithms (and some others related algorithms) on the Intel Paragon and the IBM SP2 MIMD supercomputers. These algorithms are intended to serve as building blocks for methods based on Krylov subspaces, for instance, the large sparse matrix exponential, linear systems or eigenvalue problems. Moreover, they can also be used to efficiently solve highly overdetermined linear least squares problems that are dense. I have additionally developed distributed sparse matrix-vector multiplication routines that are indispensable for the construction of such Krylov bases on parallel computers. Remarkably, these techniques are proving effective to address large-scale problems that arise in computational cell biology and bioinformatics due to the ***curse of dimensionality***. These are current hot topics as evidenced by the NSF grant of about $200K that I recently received (2013-2017), enabling to investigate "inexact (or relaxed)" techniques that are monitored adaptively. The grant fostered many classroom assignments for undergraduate research experience and was a catalyst for mentoring 7 graduate students, including 2 completed masters, 4 completed PhDs and another 1 PhD in progress. It also led to consider high-dimensional tensor methods oriented to big data. Outcomes were communicated to the scientific community in different formats, including journal articles. Collaborative visits also got a jolt, with leading researchers invited to the department to give talks and discuss their recent research, e.g., Brian Munsky (Colorado State University), Douglas Shepherd (University of Colorado Denver), Nguyen Hoang (University of West Georgia) and Miloud Sadkane (University of Brest, France).

Below are some unsolicited testimonials about EXPOKIT and its benefits to actual applications from a wide range of areas:

I am a physicist in charge of writing a module in a large simulation package for an interferometric experiment in the detection of gravitational waves. I have found extremely interesting and useful your Expokit package. Thanks a lot for making it available!
Andrea Vicere - Istituto Nazionale di Fisica Nucleare

It works fine... and VERY fast!
Dr. Jason Twamley, Laser Optics Group, Imperial College, London, UK

I just wanted to say that I ran Expokit through f2c (fortran to C conversion) and did a benchmark. Expokit was approximately 100 times faster than the naive Taylor-series implementation. I was amazed! My project is a real-time flight-simulator for model-aircraft. Modern model aircraft are very quick and agile and this gives very short time-constants (in the order of milliseconds). Maybe I should put "Powered by Expokit" somewhere on the fuselage!
Anders Musikka - anders.musikka@tele2.se

Quadrus Financial Technologies Inc. has developed a proprietary math engine that implements a variety of numerical methods for option pricing and risk analysis. Could you please approve Expokit within Quadrus to permit our commercial use.
Anthony Cabri - anthonyc@quadrusfinancial.com

TEACHING EXPERTISE

I have taught various courses/classes both at undergraduate and graduate levels. I was nominated *"Most Effective Teacher"* at UQ in Semester 1, 2000. And soon after joining UA, I was also nominated for the *"College of Arts and Sciences Leadership Board Outstanding Commitment to Students Award"* in 2011, and more recently for the "*Outstanding Graduate Mentor Award*" in 2020. My teaching experience includes the student supervisions and lectures given below.

Student supervision

Student	**Project**	**Outcome to the student**
David Rice @ UA	UG Research (Spring 2020)	Gained UG research experience by exploring the effectiveness and shortcomings of spline interpolation.
Essence Milligan-Williams @ UA	Master's Research (2019-2020): *A case-study of using tensors in multi-way electroencephalogram (EEG) data analysis*	Gained graduate research experience on using tensor decompositions to compress the large datasets that arise when brain imaging signals are continuously recorded to monitor brain activity.
Marie Neubrander @ UA	UG Research (2019-2020)	Gained UG research experience by working on stochastic automata networks (SAN) and tensor representations of high dimensional data with application to chemical kinetics. Got a faculty-reviewed paper published in an UG journal -- SIAM Undergraduate Research Online (SURIO).
Trang Dinh @ UA	PhD Research (2017-2021)	In progress. Got a reviewed paper published in the journal *Physical Biology* as an early result.

Annalee Fuller @ UA	UG Research (Fall 2017)	Gained UG research experience on representing matrices using SVD and tensor decompositions with application to chemical kinetics. Got accepted in the Master of Architecture at Northeastern University, Boston, Massachusetts.
David Lass @ UA	Master's Research (2016-2017): *Implementation of some parallel algorithms arising in sparse matrix and other applications*	Gained graduate research experience in high performance computing and some of its applications.
Maizy Pappas @ UA	UG Research (2014-15)	Gained UG research experience in the chemical master equation and Markov chains Later got accepted into UAB's Physician Assistant Studies program (Fall 2020).
Caris Mitchell @ UA	UG Research (2014-15)	Gained UG research experience in numerical techniques for ODEs. Later got accepted into UAB's medical class of 2018.
Brandon Reid @ UA	PhD Research (2014-2019): *Efficient approximation of the stationary solution to the chemical master equation*	Got a Faculty position at Milwaukee School of Engineering (2019).
Phan, (Katie) Thanh Truc V. @ UA	UG Research (2014-15)	Gained UG research experience in the polynomial approximations of functions.
Amy L. Puente @ UA	UG Research (2014-15)	Gained UG research experience in the polynomial approximations of functions.
Keisha Cook @ UA	PhD Research (2014-2019) *Parallel stochastic simulation of biochemical reactions*	Got a Postdoc position at Tulane University (2019) and a Faculty Position at Clemson (2021).
Huy Duc Vo @ UA	PhD Research (2013-2017) *Krylov approximation and model reduction methods for solving the chemical master equation*	Got a Postdoc position at Colorado State University (2017).
Khanh Ngoc Dinh @ UA	PhD Research (2013-2018) *Inexact methods for the chemical master equation with constant or time-varying propensities, and application to parameter inference*	Got a Postdoc position at Rice University (2018) and then at Columbia University's Irving Institute for Cancer Dynamics (2019).
Tom S. Bertalan @ UA	UG Research (2011-12): *Multi-Multigrid: A Parallelized Multigrid Solver for Python*	Got a PhD scholarship at Princeton (2012-2017).
Nathan Winkles @ UA	PhD thesis (2008-11): *Performance Evaluation of Inexact GMRES*	Got a Faculty position at East Mississippi Community College and then Shelton State Community College.

Douglas Weathers @ UA	UG Research (2010-11): *Computing the Exponential Function with a Modified Laguerre Expansion*	One of the winners (in math & science) at UA's Undergraduate Research & Creative Activity (URCA) Conference. Then got a scholarship to continue graduate studies at the University of Maine (2013). Completed a Master's there in 2015 there and became lecturer in 2016 at Coastal Carolina University, SC.
Jennifer Pestana @ Queensland University of Technology, Australia	UG Research (2006-07): *Solution of Richards Equation for Simulating Unsaturated Flow in Porous Media Using an Exponentially Fitted Euler Scheme* (co-supervision with Ian Turner, QUT).	Received First Class Honours in Math. She also won the University Medal for the Science Faculty 2007 and got a PhD scholarship at Oxford in Numerical Analysis (October 2008).
Shev MacNamara @ University of Queensland, Australia	PhD thesis (2005-08): *Krylov and Finite State Projection methods for simulating stochastic biochemical kinetics via the Chemical Master Equation* (co-supervision with Kevin Burrage, UQ)	Got a Postdoc position @ Oxford, then won a 2010 Fulbright Postdoctoral Scholarship @ MIT under Gil Strang. Now a Lecturer in the Math Department at the University of New South Wales.
Nguyen Si Hoang @ University of Queensland, Australia	Doctoral Development Program (2004): *Functionally fitted Runge-Kutta methods for solving ODEs*	Got a PhD scholarship at Kansas State University, and after completion, got a PostDoc position at the University of Oklahoma, and then a Faculty position at The University of West Georgia.
Thomas Schmelzer @ University of Queensland, Australia	Visiting Honours (2004). Co-supervision for 6-weeks with Nick Trefethen (Oxford University) who visited UQ for a year.	Completed his PhD at Oxford University, UK.

External Examiner outside UA

Student	**Project (Graduation Date)**
Sundar Tamang @ UAB	PhD - A Model for Currency Exchange Rates (2020)
Jessica Barnett @ UAB	PhD - Modeling Stock Prices with Differential Equations (2019)
Midhun Sukumaran @ Waterloo, Canada	PhD - Dimensionality Reduction of the Chemical Master Equation (2018)
Elliot J. Carr @ QUT, Australia	PhD - The Development of Virtual Leaf Surfaces for Interactive Agrochemical Spray Applications (2015)
Elliot J. Carr @ QUT, Australia	PhD - Exponential Integrators and a Dual-Scale Model for Wood Drying (2012)

Lectures

2020	UA – MATH610 – Iterative Methods for Linear Systems	Fall'20	Lecturer – 6 GR students
2020	UA – MATH485/585 – Intro Cplx. Var.	Spring'20	Lecturer – 24/4 UG/GR students
2019	UA – MATH300 – Intro Numer. Anal.	Fall'19	Lecturer – 21 UG students
2019	UA – MATH485/585 – Intro Cplx. Var.	Spring'19	Lecturer – 13/19 UG/GR students
2018	UA – MATH610 – Iterative Methods for Linear Systems	Fall'18	Lecturer – 5 GD students
2018	UA – MATH485/585 – Intro Cplx. Var.	Spring'18	Lecturer – 26/10 UG/GR students
2017	UA – MATH300 – Intro Numer. Anal.	Fall'17	Lecturer – 48 UG students
2017	UA – MATH238 – Appl. Diff. Eq.	Spring'17	Lecturer – 62 UG students
2016	UA – MATH610 – Iterative Methods for Linear Systems	Fall'16	Lecturer – 5 GR students
2016	UA – MATH300 – Intro Numer. Anal.	Spring'16	Lecturer – 47 UG students
2015	UA – MATH300 – Intro Numer. Anal.	Fall'15	Lecturer – 41 UG students
2015	UA – MATH485/585 – Intro Cplx. Anal.	Spring'15	Lecturer – 33/3 UG/GR students
2014	UA – MATH610 – Iterative Methods for Linear Systems	Fall'14	Lecturer – 6 GR students
2014	UA – MATH485/585 – Intro Cplx. Anal.	Spring'14	Lecturer – 30/1 UG/GR students
2013	UA – MATH126 – Calculus II	Fall'13	Lecturer – 53 UG students
2013	UA – MATH227 – Calculus III	Spring'13	Lecturer – 47 UG students
2013	UA – MATH485/585 – Intro Cplx. Anal.	Spring'13	Lecturer – 30/4 UG/GR students
2012	UA – MATH126 – Calculus II	Fall'12	Lecturer – 75 UG students
2012	UA – MATH238 – Appl. Diff. Eq.	Fall'12	Lecturer – 47 UG students
2012	UA – MATH126 – Calculus II	Spring'12	Lecturer – 75 UG students
2012	UA – MATH300 – Intro Num. Anal.	Spring'12	Lecturer – 22 UG students
2011	UA – MATH126 – Calculus II	Fall'11	Lecturer – 64 UG students
2011	UA – MATH238 – Appl. Diff. Eq.	Fall'11	Lecturer – 41 UG students
2011	UA – MATH227 – Calculus III	Sprin'11	Lecturer – 40 UG students
2011	UA – MATH238 – Appl. Diff. Eq.	Spring'11	Lecturer – 47 UG students
2010	UA – MATH238 – Appl. Diff. Eq.	Fall'10	Lecturer – 42 UG students
2010	UA – MATH125 – Calculus I	Fall'10	Lecturer – 27 UG students
2010	UA – MATH238 – Appl. Diff. Eq.	Spring'10	Lecturer – 35 UG students
2010	UA – MATH227 – Calculus III	Spring'10	Lecturer – 30 UG students
2009	UA – MATH238 – Appl. Diff. Eq.	Fall'09	Lecturer – 29 UG students
2009	UA – MATH125 – Calculus I	Fall'09	Lecturer – 45 UG students
2009	UA – MATH126 – Calculus II	Spring'09	Lecturer – 32 UG students
2009	UA – MATH610 – Iterative Methods for Linear Systems	Spring'09	Lecturer – 4 GR students
2008	UA - MATH145 – Honors Calculus I	Fall'08	Lecturer – 34 UG students
2007	UQ - MATH4202 - Advanced Techniques in Numerical Linear Algebra	Semester 1	Lecturer – 4 students (4^{th} yr)
2005	UQ - MATH4202 - Advanced Techniques in Numerical Linear Algebra	Semester 1	Lecturer – 3 students (4^{th} yr)
2004	UQ - MATH6006 – Special Topics of Scientific Computing: ill-posed problems	Semester 1	Team teaching (lecturer) – 3 students
2003	UQ - MATH4201 - Applications of Scientific Computing	Semester 1	Team teaching (lecturer) – 3 students (4^{th} yr)
2002	UQ - MATH4202 - Advanced Techniques in Numerical Linear Algebra	Semester 1	Team teaching (lecturer) – 3 students (4^{th} yr)
2000	Univ Yde - Numerical methods for the regularization of ill-posed problems	4 weeks (3 hours everyday)	Lecturer – Intensive module at the University of Yaounde, and ensuing examination at the end of the course – 10 postgraduate students

2000	UQ - MN476 - Advanced Parallel Computation	Semester 1	Team teaching (lecturer) – 3 students (4th yr)
1997	UQ - ME303 - Engineering Mathematics IIIc (Introductory Numerical Techniques)	6 hours	Team teaching (lecturer) – 60 UG students
1996	UQ - HPC	1 week	Workshop (lecturer) – featuring guest spealer Prof. J. Dongarra from the University of Tennesse and Oak Ridge National Labs
1996	UQ - MN320 - Introduction to High Performance Computing	Semester 2	Team teaching
1996	Univ Yde - Matrix functions and applications	2 weeks (4 hours everyday)	Lecturer – Intensive module at the University of Yaounde, and ensuing examination at the end of the course – 15 postgraduate students
1995	UQ - HPC	Semester 2	Team teaching
1994	Univ Rennes1 - Algorithms and data structures	Semester 1	Team teaching (tutor) – 30 undergraduate students at the University of Rennes (France)
1993	Univ Rennes1 - Numerical analysis	Semester 2	Team teaching (tutor) – 30 undergraduate students at the University of Rennes (France)

RESEARCH COLLABORATIONS

2009-todate: Inexact Krylov methods
2005-todate: Numerical methods in computational biology, with K. Burrage, M. Hegland, S. MacNamara.
2005-todate: Numerical methods for ODEs, with N.S Hoang.
2004: Matlab and grid computing (grid-enabled implementation of some genetic regulatory models), with K. Burrage, P. Burrage, G. Ericksson, S. Jeffrey, T. Pickett, T. Tian, A. Trefethen.
2004: Integrating Australia to Global e-Science, with K. Burrage, A. Trefethen.
2002-2006: Affiliated to the Australian Partnership for Advanced Computing (APAC).
2000-todate: MathML and web technology for mathematics education, with Mozilla and W3C.
1995-todate: Scientific computation, with local and international collaborators.

SERVICE

As Associate Dean for Multicultural Affairs of the College of Arts and Sciences, I participate in activities to publicize UA and help recruit more minority or under-represented faculty and students. Due to my longstanding role as the **chief DEI officer** in our College, I am regularly approached by other stakeholders to provide inputs or share the experience of the initiatives I have been involved with. I am a member of our university-wide **Academic Diversity Council**. I was the chair of our university-wide **Future Faculty Committee** charged with drafting a set of recommendations, including a series of best recruiting and retention practices, for a pipeline toward increasing faculty diversity on our campus. I chaired our College's inaugural **Postdoc-to-Faculty** hiring pipeline, tasked with designing a process and rubric for this diversity initiative. The legacy is now set in our College and has attracted interest from others wishing to replicate our processes and who ask me to drill into the nitty gritty details.

Also, through my involvement as organizer of the **Graduate Recruiting Expo** (GREX) for the College, I helped bring graduate students from around the country to the UA campus, with a special focus given to women and minorities A noteworthy example is that of a minority female African-America candidate who had to turn down a very competitive offer that Purdue University gave her. After graduating from our campus, she went on to become a PostDoc at Tulane and then a Tenure-Track faculty at Clemson. In the past, I have chaired our College's **Diversity Committee** and have been a member of the Department of Mathematics' **Graduate Course Committee**.

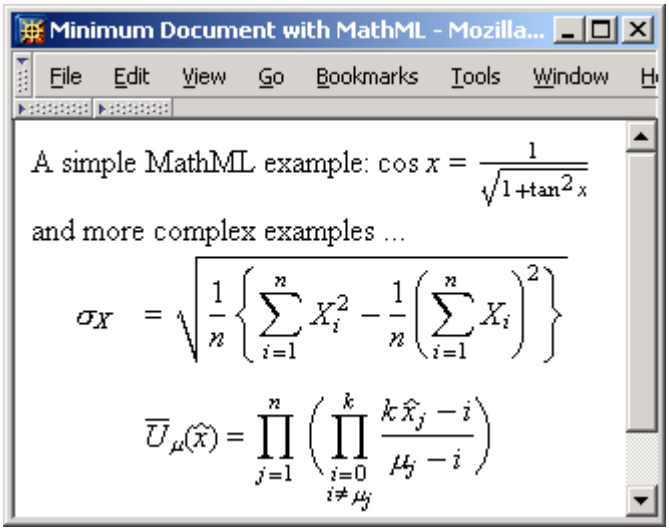
I have been a **Programme Committee** member for conferences such as the International Conference on the Numerical Solution of Markov Chains (NSMC'10) at the College of William & Mary, Williamsburg, VA; the International Conference on Scientific Computation And Differential Equations (SciCADE'99); the 10th Computational Techniques and Applications Conference (CTAC'01); the International Conference on the Numerical Solution of Markov Chains (NSMC'03) at the University of Illinois at Urbana-Champaign, IL; the 150th

Markov Anniversary Meeting in the College of Charleston, SC. I co-edited the Proceedings of CTAC'01. I am a **regular reviewer** for computational science journals, refereed conferences, MSc, or PhD theses. Examples include: SIAM Journal of Scientific Computing, Numerical Algorithms, Journal of Computational and Applied Mathematics, IEEE Transactions on Automatic Control, Automatica.

I was also the **External Promotion Reviewer** at Florida Gulf Coast University for a portfolio case that was seeking promotion from Associate Professor to Full Professor in 2020.

I have been involved in developing in-depth scientific algorithms/codes that require considerable time to bear fruit. Successfully producing these outcomes relies first on the hands-on involvement of the inventor. An example is the new QRT algorithm published in the distinguished SIAM Journal of Matrix Analysis and Applications. This is a groundbreaking contribution to what has been a challenging problem in numerical analysis since the introduction of digital computers, with round-off errors due to finite precision arithmetic. Associated to this is the comparison of these codes with other competing codes. It is indeed revealing to see my final algorithms/codes gaining long-lasting acceptance and be embedded within numerous applications (some commercial) owing to their quality, and be commended by veteran numerical analysts such as Prof. Moler and Prof. Van Loan cited earlier.

Through 2000-2002, I developed a completely new **expertise in web technologies** both for collaborative web-based research and for mathematics education. Through this new involvement, I studied the fine points of computerized mathematical typesetting and developed a Mathematical Markup Language (MathML) renderer *inside* the source code of the Firefox web browser. This mathematical renderer is now an integral part of the official code of all Firefox releases. See the example screenshot that shows the output of my renderer. The screenshot is not made up of images produced by LaTeX2HTML (or similar) and included in the web page with <img> tags. Nor is the web page using plug-ins. Rather, my renderer takes as input the tag-based syntax of MathML, and then does an inline formatting in a TeX-like manner.



As this happens *at the heart of the browser*, I had to first study and understand the inner workings of the browser's source code as well (it is absolutely amazing—over six million lines of C++). Moreover, the effort required a mathematical background to best computerize the fine points of mathematical notation (as opposed to generic programming). This multifaceted and massive investment has since paid other considerable dividends because browsers embedding my renderer have been distributed to hundreds of million users. I am now regarded as an international expert on MathML, and I was invited from Australia to the Ontario Research Centre for Computer Algebra (ORCA) in Canada and was an invited speaker at the International MathML Conference 2002 in Chicago. I have contributed two book chapters. On May 2004, I was featured in a cover story of The Sydney Morning Herald and The (Melbourne) Age, where I was branded by the mainstream press as *"one of the quietest open source achievers in Australia"*. The work also led to several invitations (all expenses paid) in the USA while I was in Australia, including at MacKichan Software, Inc., (maker of Scientific WorkPlace), in Las Cruces, New Mexico (June 2005), and two invitations at the Firefox Engineering Summit in Mountain View, CA (December 2005 and November 2006). It also resulted in a further invitation at the Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis (December 2006).

Besides my more specialized MathML add-on, my acquired familiarity with the Mozilla Firefox codebase led to other notable contributions. For example, I implemented the backend codes for "View Selection Source" and the capability of finding text in the form fields <input> and <textarea>, which are of general benefit and are pervasive to end-users of Firefox today. Every time users make a selection and click "View Selection Source" in the context menu, or invoke "Find" in web pages, they are unknowingly executing code paths I contributed. In fact, my involvement led me to be credentialed as a **reviewer and super-reviewer for the Mozilla Firefox opensource project** due to my deep proficiency with the codebase. This meant that other contributed codes endorsed with my stamps **r=rbs** and **sr=rbs** were deemed of quality to be checked in the mozilla.org CVS repository.

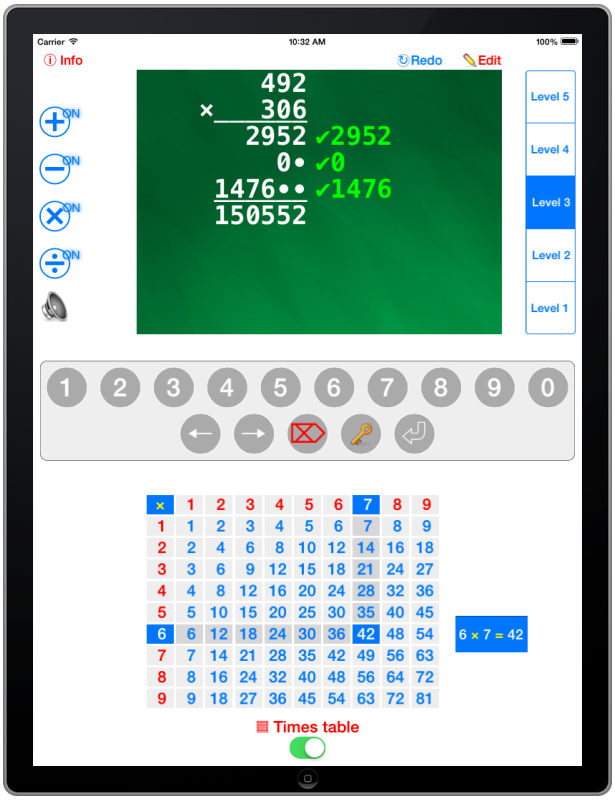
Below are some unsolicited testimonials about my work in MathML:

*I have been teaching Calculus for Engineers in a rather high tech class. One result is a full set of calculus I and II notes in HTML and MathML, 45*3*12 = 1,620 pages x 2 courses.*
Paul Gartside - gartside@math.pitt.edu, Department of Mathematics, University of Pittsburgh, USA.

I find that most of my faculties here would love to be able to use math formulas in standard web pages as part of their coursework.
James Bromberger - james@publishing.uwa.edu.au,
Campus Wide Information Systems Officer (University of Western Australia)

I'm currently planning to markup my undergraduate maths notes in the form of a mathematical dictionary that I hope will be of use to future maths undergraduates. MathML support in Mozilla will make my efforts readable across the globe!
Ben Pickering - maump@csv.warwick.ac.uk

Through 2013-2014, I received a grant from the College's Academy of Research, Scholarship, and Creative Activity (CARSCA) to develop yet another completely new **expertise in coding an interactive mobile app**. The end-product that I developed was a mathematics app on the iPad (see the included screenshot that shows my app in action). Not only did this require familiarising myself with the nuts and bolts of app development but also on entering the Apple iOS ecosystem. The app allows 3rd-4th graders to develop early math skills by *doing* arithmetic operations on the touch-based interface of the iPad tablet. Unlike several other apps, the particularity of my app is that it provides instant feedback that allows students to recover and learn from their mistakes. Such instant feedback is especially useful when help is not forthcoming, as is often the case for **underserved students**. With this app, they can practice more, grow in confidence, develop good habits at an early stage, and become more skillful and quicker at performing the steps. The app is designed with sound effects to make the learning not only intuitive and effective, but also fun and enjoyable.



The work attracted further interest from UA's Office of Academic Affairs who provided funding for iPads to be used in the actual environment of a classroom where the app could be validated. In collaboration with Dr Priscilla Davis (Department of Communicative Disorders) and with the assistance of five UA students volunteers, a pilot intervention was conducted at Holt Elementary School, an underserved school in Tuscaloosa that was devastated by the April 2011 tornado. We were able to ascertain the benefits in terms of improved skills and grades. In particular, there was a reduction in the number of attempts to get answers right, meaning that the instant feedback paid off.

As with my other diversity initiatives, lateral thinking sheds light into the broader impacts. Here, developing proficiency at this decisive stage is meant to prevent the dreaded "math phobia" from settling in, and so there is the long-term goal of making a contribution at **reducing the achievement gap** in advanced classes later, especially when considering underserved students. And there is the transformative goal of inspiring others in underserved communities to get involved in the thriving **app economy** that is worth several billions; or to more generally embark in **entrepreneurial directions** toward becoming makers of products instead of mere consumers.

Like most mathematicians, I never had to personally conduct field-testing of analytical ideas, let alone on human subjects. Because of the intervention on children, this was my first project that involved developing a human subjects protocol application for submission to the Institutional Review Board (IRB). After several reviews, UA's Office of Compliance granted approval. This was an eye opening effort with regards to those other aspects.

SOFTWARE

I have a *hands-on experience* in programming vector and parallel supercomputers for large-scale problems, encompassing shared-memory systems (Cray90, SGI PowerChallenge and SGI Origin), distributed memory systems (Intel Paragon, IBM SP2), and massively parallel systems (DECmpp12000/MasPar). My software output includes:

- numerous sequential or parallel codes in Fortran, C/C++ or Matlab for my papers and other projects.
- the Expokit matrix exponential package, which is the one and only package of its kind, and has been embedded in several applications (some commercial).
- the MathML renderer in C++ for the Gecko web browser engine (which powers Mozilla Firefox and other web browsers on desktops and mobile devices).
- the mathematics app on the iPad that provides a touch-based interface for elementary students to practice arithmetic with instant feedback.

I also wrote HPC user manuals that have been used for training in several institutions around the world, including:

- **Sidje, R.B**., *Spotlight on the SGI Power Challenge Array*. Technical Report, Department of Mathematics, University of Queensland, 1995.
- **Sidje, R.B**., *Self-starting guide for the IBM Scalable POWERparallel SP2*. Technical Report, Department of Mathematics, University of Queensland, 1995.

OTHER SKILLS

Language skills – fluent French speaker

SELECTED MEETING/CONFERENCE PRESENTATIONS

I have given several seminars at other university departments and have participated in several conferences or workshops, either as a conference or mini-symposium organiser, an invited speaker or a presenter. Some of my recent conference presentations include:

- Speaker at the 17th International Conference of Numerical Analysis and Applied Mathematics (ICNAM) – Honoring Kevin Burrage's career in Numerical Analysis and Applied Mathematics, Rhodes, Greece, September 23-28, 2019.
- Speaker at the University of Waterloo, Canada, December 5, 2018
- Invited speaker twice at Xi'an Jiaotong-Liverpool University (XJTLU), Suzhou, China, December 16, 2016, and August 17, 2015.
- Speaker at the 20th IMACS World Congress (International Association for Mathematics and Computers in Simulation), Xiamen, China, December 10-14, 2016.
- Speaker in two talks at the 8th International Congress on Industrial and Applied Mathematics (ICIAM), Beijing, China, August 10-14, 2015.
- Speaker at the 2014 BIOT Symposium, Brigham Young University, Provo, Utah, Dec 11-12, 2014
- Speaker at the University of Brest, France, May 20, 2014
- Poster presentation at the 5th Conference on Systems Biology of Mammalian Cells, Berlin, Germany, May 12-14, 2014.
- Speaker at the 13th Copper Mountain Conference on Iterative Methods, Colorado, April 6-11, 2014
- Speaker at the Academies Conference-College Academy - CARSCA, 2014
- Speaker at the SAMSA Conference, Cape Town, South Africa, November 25-29, 2013
- **Invited Panelist at NSF Headquarters,** Arlington, VA, 2013
- Poster presentation at the 2013 Gordon Research Conference, Lucca (Barga), Italy, August 4-9, 2013
- Invited Faculty Panelist at the symposium "Opening the (Graduate) Schoolhouse Door at UA", 9/12/2013

- Speaker at the Academies Conference-College Academy to Improve Student Success-CAISS, Apr 6, 2011
- Speaker at the JP meeting UA-UAB-UAH in Tuscaloosa, October 30, 2010.
- Seminar at the University of Yaounde I, Cameroon, Sept 23, 2010.
- Speaker and Member of the Program Committee of the 6th International Workshop on the Numerical Solutions of Markov Chains, Sept 16-17 2010, Williamsburg, Virginia
- Invited speaker at the Numerical methods and North-South Cooperation – an invitation-only conference in honor of Bernard Philippe for his 60th birthday. University of Yaounde I, Cameroon, March 2-7, 2009.
- Speaker at the Joint-Program meeting UA-UAB-UAH in Birmingham, November 1, 2008.

Prior starting at UA in Fall'08:

- Speaker at the 51st Annual Meeting of the Australian Mathematical Society, La Trobe University, Melbourne, September 25-28, 2007.
- Speaker at the 6th International Congress on Industrial and Applied Mathematics (ICIAM 2007), Zurich, Switzerland, July 16-20, 2007.
- Speaker at the International Conference on Scientific Computation And Differential Equations (SciCADE'07), St Malo, France, July 9-14, 2007.
- Speaker at the Workshop on High-dimensional Approximation, Australian National University, Canberra, February 18-22, 2007.
- Invited speaker at Florida A&M University, Tallahassee, FL, USA, December 14-19, 2006.
- Invited speaker at Emory University, Atlanta, GA, USA, December 10-13, 2006.
- Invited at the IMA "Hot Topic" Workshop on The Evolution of Mathematical Communication in the Age of Digital Libraries. Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN, USA, December 8-9, 2006.
- Invited lecturer at the APAC Summer School in Computational Science, December 4-8, 2006, Queensland University of Technology, Brisbane.
- Invited at the Firefox Engineering Meeting, Mountain View, CA, USA. November 14-17, 2006.
- Speaker at the Computational Techniques and Applications Conference (CTAC), James Cook University, Townsville, July 2-5, 2006.
- Speaker and Member of the Program Committee of the 150th anniversary of the birth of A.A. Markov and the 100th anniversary of his seminal papers on Markov Chains, Charleston, SC, USA. June 12-14, 2006.
- Invited speaker at the Firefox Engineering Meeting, Mountain View, CA, USA. December 2-9, 2005.
- Invited speaker at the Symposium on Optimisation and Data Analysis in honour of Prof. Mike Osborne's 70th birthday, Australian National University, Canberra, Sept 21-23, 2005.
- Invited lecturer at the Institute for Molecular Bioscience (IMB) Winter School, Brisbane, July 5-9, 2004.
- Speaker at the APAC'03 Conference and Exhibition on Advanced Computing, Grid Applications and eResearch, at the Gold Coast, Sept 29 – Oct 2, 2003.
- Speaker at the 5th International Congress on Industrial and Applied Mathematics (ICIAM), Sydney, July 7-11, 2003.
- Speaker at the International Conference of Computational Science (ICCS), Melbourne, June 2-4, 2003.
- Speaker at the APAC Education Workshop in Sydney, October 3-4, 2002.
- Invited plenary speaker at the second International MathML Conference in Chicago, June 28-30, 2002.
- Invited speaker at the Ontario Research Centre for Computer Algebra (ORCCA), University of Western Ontario, Canada. June 21–27, 2002.
- Speaker at the Winter Workshop on Iterative Methods for Large Sparse Matrix Systems at QUT, featuring guest speaker Prof. Y. Saad from the University of Minnesota. July 8-10, 2002.

HONORS

Included in Who's Who.

GRANTS

Through 2013-2017, I held an NSF grant worth roughly $200K. Before my administrative appointment as Associate Dean in 2013, I kept up the effort at making grant applications, with uninterrupted submissions at the local (RGC) and national levels (NSF), as well as in industry (Intel). I completed David G. Bauer's 18 month

Research Fellowship Program on advanced grant seeking skills, together with his Quality Circles to improve grant proposals.

I have been a co-chief investigator in a number of ARC (Australian Research Council) grants. I have also received several travel grants to support my MathML work. Highlights of my funding include:
2013: External Grant from NSF, US$193,000
2013: External Grant from the Simons Foundation, US$35,000, but had to decline because of the NSF grant
2013: Grant from UA's RGC (Research Grant Committee), US$6,000
2013: Grant from UA's Office of Academic Affairs (OAA) Seed Funding Program on STEM in Underserved K-12 Schools in West Alabama, US$5,000
2013: Grant from UA's CARSCA (College Academy of Research, Scholarship, and Creative Activity), US$3,300
2009: Teaching grant from UA's CAISS (College Academy to Improve Student Success), US$5,000
2006: Travel grant at IMA (Institute for Mathematics and its Applications), US$1700
2005-2006: MathML in Firefox (Mozilla), US$6000
2005: Travel grant at MSI (Mackichan Software, Inc), US$3000
2004: Doctoral Development Program (UQ), AU$4000
2002: MathML support (ORCCA), US$2000
2000: Visiting Professor (INRIA, Rennes), French Francs 13,000
2000: MathML rendering (Netscape/Wolfram Research), US$4000
1997-1999: Numerical Solutions of DAEs in Process Engineering (ARC), AU$126K, with K. Burrage, I. Cameron.
1997-1999: Polymer melts (ARC), AU$165K, with K. Burrage, M. Mackay
1997: Stochastic models & techniques for SODEs in environmental modelling (ARC), AU$20K, with K. Burrage, R.Volker
1996: Matrix-free Parallel Methods for DAEs in process engineering (ARC), AU$19K, with I. Cameron

PUBLICATIONS

A. *ACCEPTED / APPEARED*

A.1. Dinh, T.T.N. and **Sidje, R.B.** *An adaptive solution to the chemical master equation using quantized tensor trains with sliding windows.* Phys. Biol., 2020. https://doi.org/10.1088/1478-3975/aba1d2

A.2. Reid, B.M. and **Sidje, R.B.** *From the transient to the stationary solution to the chemical master equation using tensors*. AIP Conference Proceedings of the 17th International Conference of Numerical Analysis and Applied Mathematics (ICNAAM), 2293, 420073 (2020). https://doi.org/10.1063/5.0026815

A.3. Reid, B.M. and **Sidje, R.B.** *Finite state projection for approximating the stationary solution to the chemical master equation using reaction rate equations*, Mathematical Biosciences 316 (2019) 108243. https://doi.org/10.1016/j.mbs.2019.108243

A.4. Dinh, K.N. and **Sidje, R.B**. *A comparison of the Magnus expansion and other solvers for the chemical master equation with time-dependent propensities*. Proceedings of the 4th International Conference on Applied Mathematics, Modeling and Computational Science (AMMCS). 2017. https://dx.doi.org/10.1007/978-3-319-99719-3_24

A.5. Dinh, K.N. and **Sidje, R.B.** *An adaptive Magnus expansion method for solving the chemical master equation with time-dependent propensities*, J. Coupled Syst. Multiscale Dyn. 5(2):119–131, 2017. https://doi.org/10.1166/jcsmd.2017.1124

A.6. Dinh, K.N. and **Sidje, R.B.** *An application of the Krylov-FSP-SSA method to parameter fitting with maximum likelihood*, Phys Biol. 14 (2017) 065001. https://doi.org/10.1088/1478-3975/aa868a

A.7. Vo, H.D. and **Sidje R.B**. *An adaptive solution to the chemical master equation using tensors*. J. Chem. Phys, 147(49):044102, 2017. https://dx.doi.org/10.1063/1.4994917

A.8. Vo, H.D. and **Sidje, R.B.** *Solving the chemical master equation with the finite state projection and inexact uniformization in quantized tensor train format*. Peer-reviewed Proc. of the 5th International Conference on Computational and Mathematical Biomedical Engineering (CMBE17), 2017:1108-1111.

A.9. Dinh, K.N. and **Sidje, R.B.** *Analysis of inexact Krylov subspace methods for approximating the matrix exponential.* Math. Comput. Simul. 138:1-13, 2017. https://dx.doi.org/10.1016/j.matcom.2017.01.002

A.10. Vo, H.D. and **Sidje, R.B.** *Approximating the large sparse matrix exponential using incomplete orthogonalization and Krylov subspaces of variable dimension*, Num. Lin. Alg. Appl., 24(29):e2090, 2017. https://dx.doi.org/10.1002/nla.2090

A.11. Sadkane, M. and **Sidje, R.B.** *An alternating maximization method for approximating the hump of the matrix exponential*. BIT Numerical Mathematics. 57(3):609-628, 2017. http://dx.doi.org/10.1007/s10543-016-0644-7

A.12. Vo, H.D. and **Sidje, R.B.** *Implementation of variable parameters in the Krylov-based finite state projection for solving the chemical master equation*, Appl. Math. Comput. 293(15):334-344, 2017. http://dx.doi.org/10.1016/j.amc.2016.08.013

A.13. Vo, H.D. and **Sidje, R.B.** *Improved Krylov-FSP method for solving the chemical master equation*, Lecture Notes in Engineering and Computer Science (Peer-reviewed Proceedings of the World Congress on Engineering and Computer Science - WCECS) 2226(1):521-526, 2016. http://www.iaeng.org/publication/WCECS2016/WCECS2016_pp521-526.pdf

A.14. Vo, H.D. and **Sidje, R.B.** *Solving the chemical master equation by aggregation and Krylov approximations*, Peer-reviewed Proceedings of the 2016 IEEE 55th Conference on Decision and Control (CDC), 2016:7093-7098. http://dx.doi.org/10.1109/CDC.2016.7799362

A.15. Vo, H.D. and **Sidje, R.B.** *Computational study of p53 regulation via the chemical master equation,* Phys. Biol. 13(3):035001, 2016. http://dx.doi.org/10.1088/1478-3975/13/3/035001

A.16. Dinh, K.N. and **Sidje, R.B**. *Understanding the finite state projection and related methods for solving the chemical master equation*, Phys. Biol. 13(3):035003, 2016. http://dx.doi.org/10.1088/1478-3975/13/3/035003

A.17. Sadkane, M. and **Sidje, R.B.** Efficient computation of the spectral projections of regular matrix pairs, J. Comput. Appl. Math., 298:72-81, 2016. http://dx.doi.org/10.1016/j.cam.2015.11.035

A.18. Hoang, N.S. and **Sidje, R.B.** *Functionally fitted Runge-Kutta-Nyström methods*, BIT Numerical Mathematics, 56:129-150, 2016. http://dx.doi.org/10.1007/s10543-015-0561-1

A.19. Dinh, K.N. and **Sidje, R.B**., *A case study of solving the chemical master equation with time-varying parameters*. Peer-reviewed Proceedings of the 2105 Biotechnology and Bioinformatics (BIOT) Symposium, 2015.

A.20. Vo, H.D. and **Sidje, R.B.** *Advances in the Krylov-based finite state projection algorithm*. Peer-reviewed Proceedings of the 2105 Biotechnology and Bioinformatics (BIOT) Symposium, 2015.

A.21. **Sidje, R.B.** and Vo, H.D. *Solving the chemical master equation by a fast adaptive finite state projection based on the stochastic simulation algorithm*, Mathematical Biosciences, 269:10-16, 2015. http://dx.doi.org/10.1016/j.mbs.2015.08.010

A.22. **Sidje, R.B.** and Vo, H.D. *A projection method based on the stochastic simulation algorithm*. Peer-reviewed Proceedings of the 2104 Biotechnology and Bioinformatics (BIOT) Symposium, 2014.

A.23. Bertalan, T.S., Islam, W., **Sidje, R.B.** and Carlson, E.S. *OpenMG: A New Multigrid Implementation in Python*. Num. Lin. Alg. Appl., 21(5):685-700, 2014. http://dx.doi.org/10.1002/nla.1920

A.24. Hoang, N.S. and **Sidje, R.B.** *On the equivalence of the continuous Adams-Bashforth method and Nordsieck's technique for changing the step size*. Appl. Math. Letters, 26(7):725-728, 2013. http://dx.doi.org/10.1016/j.aml.2013.02.001

A.25. **Sidje, R.B**. *Inexact uniformization and GMRES for large Markov chains*. Num. Lin. Alg. Appl., 18(6):947-960, 2011. http://dx.doi.org/10.1002/nla.794

A.26. **Sidje, R.B**. *On the simultaneous tridiagonalization of two symmetric matrices*. Numer. Math., 118(3):549-566, 2011. http://dx.doi.org/10.1007/s00211-010-0357-9

A.27. **Sidje, R.B.**, Winkles, N. *Evaluation of the performance of inexact GMRES*. J. Comput. Appl. Math., 235:1956-1975, 2011. http://dx.doi.org/10.1016/j.cam.2010.09.022

A.28. **Sidje, R.B**. and Saad, Y. *Rational approximation to the Fermi-Dirac function with applications in density functional theory.* Numerical Algorithms, 56(3):455-479, 2011. http://dx.doi.org/10.1007/s11075-010-9397-6

A.29. **Sidje, R.B.**, *Inexact uniformization and GMRES for computing transient and stationary probabilities.* Peer-reviewed Proceedings of the 6th International Workshop on the Numerical Solutions of Markov Chains. Editors: M. Benzi, T. Dayar. 2010.

A.30. Sheehan, B.N., Saad, Y. and **Sidje, R.B**. *Computing exp(-τA)b with Laguerre polynomials*. Electronic Transactions on Numerical Analysis (ETNA), 37:147-165, 2010. http://etna.mcs.kent.edu/vol.37.2010/pp147-165.dir/pp147-165.pdf

A.31. McNamara, S., Bersani, A.M., Burrage, K. and **Sidje, R.B.** *Stochastic chemical kinetics and the total quasi-steady-state assumption: application to the stochastic simulation algorithm and chemical master equation*. J. Comp. Phys., 129(9):095105-095105-13, 2008. http://dx.doi.org/10.1063/1.2971036 [*Later selected for the September 15, 2008 issue of Virtual Journal of Biological Physics Research*.]

Prior starting at UA in Fall'08:

A.32. McNamara, S., Burrage, K. and **Sidje, R.B**. *Application of the Strang splitting to the chemical master equation for simulating biochemical kinetics*. International J. Computational Science on Additive and Multiplicative Operator Splitting, 2(3):402-421, 2008.

A.33. MacNamara, S., Burrage, K., and **Sidje, R.B**. *Multiscale modeling of chemical kinetics via the master equation*. SIAM J. Multiscale Modeling and Simulation, 6(4):1146-1168, 2008. http://dx.doi.org/10.1137/060678154

A.34. **Sidje, R.B.,** Williams, A.B. and Burrage, K. *Fast generalized cross validation using Krylov subspace methods*. Numerical Algorithms, 47(2):109-131, 2008. http://dx.doi.org/10.1007/s11075-007-9150-y

A.35. Hoang, N.S. and **Sidje, R.B.** *On the stability of functionally fitted Runge-Kutta methods*. BIT Numerical Mathematics, 48(1):61-77, 2008. http://dx.doi.org/10.1007/s10543-007-0158-4

A.36. Hoang, N.S. and **Sidje, R.B.** *Functionally fitted explicit pseudo two-step Runge-Kutta methods*. Appl. Numer. Math 59(1):39-55, 2009. http://dx.doi.org/10.1016/j.apnum.2007.11.023

A.37. MacNamara, S., Burrage, K. and **Sidje, R.B**. *Numerical methods for the chemical master equation and applications to stochastic models or receptor oligomerisation*, Proc. Appl. Math. Mech (PAMM), 7(1): 2110001–2110002, 2007. http://dx.doi.org/10.1002/pamm.200700209

A.38. McNamara, S., Burrage, K. and **Sidje, R.B**. *Stochastic analysis of the VEGF receptor response curve*. In T.D. Pham and X. Zhou, editors, Computational Models for Life Sciences—CMLS '07: 2007 International Symposium on Computational Models of Life Sciences, pp. 238-247, AIP Conference Proceedings Volume 952, 2007. ISBN 978-0-7354-0466-3. http://dx.doi.org/10.1063/1.2816628 [*Later selected for adaptation and republication in JCAET Special Issue on Engineering and Computational Technologies in the Life Sciences, 2008*.]

A.39. **Sidje, R.B.** and Hoang, N. S. *On the stability function of functionally fitted Runge-Kutta methods*. In W. Read and A.J. Roberts, editors, Proceedings of the 13th Biennial Computational Techniques and Applications Conference, CTAC-2006, Vol. 48(E) of *ANZIAM J.*, pp. C151-C167, 2007.

A.40. McNamara, S., **Sidje, R.B.** and Burrage, K. *An improved dynamic finite state projection algorithm for the numerical solution of the chemical master equation with applications*. In W. Read and A.J. Roberts, editors, Proceedings of the 13th Biennial Computational Techniques and Applications Conference, CTAC-2006, Vol. 48(E) of *ANZIAM J.*, pp. C397-C419, 2007.

A.41. **Sidje, R.B.**, Burrage, K. and McNamara, S. *Inexact uniformization method for computing transient distributions of Markov chains*. SIAM J. Sci. Comput., 29(6):2562-2580, 2007. http://dx.doi.org/10.1137/060662629.

A.42. Hoang, N.S., **Sidje, R.B.** and Cong, N.H. *Analysis of trigonometric implicit Runge-Kutta methods*. J. Comput. Appl. Math., 198:187-207, 2007. http://dx.doi.org/10.1016/j.cam.2005.12.006

A.43. Hoang, N.S., **Sidje, R.B.** and Cong, N.H. *On functionally-fitted Runge-Kutta methods*, BIT Numerical Mathematics, 46:861-874, 2006. http://dx.doi.org/10.1007/s10543-006-0092-x.

A.44. Burrage, K., Hegland, M., McNamara, S., and **Sidje, R.B.** *A Krylov-based finite state projection algorithm for solving the chemical master equation arising in the discrete modelling of biological systems*. In Markov 150th Anniversary Meeting, A.N. Langville and W.J. Stewart (eds), pp. 21-38, 2006. Boson Books. ISBN 1932482342.

A.45. **Sidje, R.B**., and Burrage, K. (2005): *QRT: A QR-based tridiagonalization algorithm for nonsymmetric matrices*. SIAM J. Mat. Anal. Appl., 26(3):878-900, 2005. http://dx.doi.org/10.1137/040612476

A.46. **Sidje, R.B.**, *Make MathML content.* In Firefox Hacks, O'Reilly & Associates, N. McFarlane, 2005. ISBN 0596009283.

A.47. **Sidje, R.B**, *Install fonts and character support.* In Firefox Hacks, O'Reilly & Associates, N. McFarlane, 2005. ISBN 0596009283.

A.48. Burrage, K., Burrage, P., Jeffrey, S., Pickett, T., **Sidje, R.B.** and Tian, T.: *A grid implementation of chemical kinetic simulation methods in genetic regulation.* Proceedings of the APAC Conference and Exhibition on Advanced Computing, Grid Applications and eResearch, 2003.

A.49. **Sidje, R.B.**, Burrage, K. and Philippe, B. (2003): *An augmented Lanczos algorithm for the efficient computation of a dot-product of a function of large sparse symmetric matrix.* P. M. A. Sloot, D. Abramson, A.V. Bogdanov, J.J. Dongarra, A.Y. Zomaya and Y.E. Gorbachev (Editors): Lecture Notes in Computer Science 2659, pp. 693-704, 2003. http://dx.doi.org/10.1007/3-540-44863-2_68

A.50. Burrage, K. and **Sidje, R.B**., Eds: *ANZIAM J.* Vol. 44(E). Proc. of 10th Computational Techniques and Applications Conference CTAC-2001.

A.51. Christen, P., Altas, I, Hegland, M., Roberts, S., Burrage, K. and **Sidje, R.B.** *Parallelization of a finite element surface fitting algorithm for data mining.* Vol. 42(E) of *ANZIAM J.*, pp. C385-C399, 2000.

A.52. Christen, P., Altas, I, Hegland, M., Roberts, S., Burrage, K. and **Sidje, R.B.** *A parallel finite element surface fitting algorithm for data mining.* Proceedings of the ParCo-99 Conference, Delft, 17-20 August 1999.

A.53. Sadkane, M. and **Sidje, R.B.** *Implementation of a variable block Davidson method with deflation for solving large sparse eigenproblems*. Numerical Algorithms, 20:217-240, 1999. http://dx.doi.org/10.1023/A:1019199700323

A.54. **Sidje, R.B.** and Stewart, W. J. *A numerical study of large sparse matrix exponentials arising in Markov chains*. Computational Statistics & Data Analysis, 29:345-368, 1999. http://dx.doi.org/10.1016/S0167-9473(98)00062-0

A.55. **Sidje, R.B.** *Expokit: A software package for computing matrix exponentials*. ACM, Transactions on Mathematical Software, 24(1):130-156, 1998. http://dx.doi.org/10.1145/285861.285868

A.56. Galand, M., Lilensten, J., Kofman, W. and **Sidje, R.B.**: *Proton transport in the ionosphere, 1. Multistream approach of the transport equation*. Journal of Geophysical Research, Vol. 102(A10), pp. 22,261-22,272, 1997. http://dx.doi.org/10.1029/97JA01903

A.57. Burrage K, Eldershaw, C. and **Sidje R.B**. *A Parallel matrix-free implementation of a Runge-Kutta code*. Proceedings of the 15th IMACS World Congress on Scientific Computation, Modelling and Applied Mathematics, Berlin (Germany), Vol. 2, 45-50, 1997.

A.58. **Sidje, R.B.** *Alternatives for parallel Krylov basis computation*. Numerical Linear Algebra with Applications, 4(4):305-331, 1997. http://dx.doi.org/10.1002/(SICI)1099-1506(199707/08)4:4<305::AID-NLA104>3.0.CO;2-D

A.59. Philippe, B. and **Sidje, R.B.** *Transient solutions of Markov processes by Krylov subspaces*. In Computations with Markov Chains, Stewart WJ (ed.). Kluwer Academic: Boston, 95–119, 1995. http://dx.doi.org/10.1007/978-1-4615-2241-6_7

A.60. Philippe, B. and **Sidje, R.B.** *Parallel algorithms for the Arnoldi procedure*. In Iterative Methods in Linear Algebra, II, IMACS Series in Computational and Applied Mathematics 3, IMACS, New Brunswick, NJ, 156-165, 1995.

T. TECHNICAL REPORTS

T.1. Sidje, R.B., Diminishing returns of extra loan repayments, 2010.

T.2. Sidje, R.B., Spotlight on the SGI POWER CHALLENGEarray, 1995

T.3. Sidje, R.B., A self-starting guide for the IBM SP2, 1995

T.4. Philippe, B. and Sidje, R.B., Transient solutions of Markov processes by Krylov subspaces, 1993

T.5. Sidje, R.B. and Sadkane, M., An adaptive sparse unsymmetric linear system solver, 1992