CURRICULUM VITAE

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EDUCATION

Degree	University	Year
Ph.D.	Institute of Control Sciences, Russian Academy of Sciences, Moscow	1984
Ph.D. Thesis	Stochastic Modeling of Computer Systems and Queuing Networks	

EXPERTISE and RESEARCH INTERESTS

Use of Technology in the Teaching of Mathematics, Statistics and Related Disciplines
Scientific Computing, Numerical Analysis, Optimization
Optimization Methods for Financial Modelling
Stochastic Modeling, Simulation
High-precision Numerical Computing
Operations Research, Queuing Networks
Programming Languages C++, C#, Matlab, R, Mathematica

EMPLOYMENT HISTORY

Western University

Date	Position	Department
2004 - Current	Assistant Professor	Applied Mathematics
2000 - Current	Assistant Professor	Statistical & Actuarial Sciences
2016 - 2017	Assistant Professor	Electrical & Computer Engineering
2003	Research Associate	ESSO Centre for Mathematics Education

Nexus Solutions Inc., London, ON, Canada

Date	Position
June 2010 - Apr. 2011	Software Developer

Elite Technologies Ltd., London, ON, Canada

Date	Position
1999	Software Developer

International DEWA Company, Minsk, Belarus & Leipzig, Germany

Date	Position
1993 - 1998	Director / Project Manager

Central Research Institute for Applied Computer Science, Minsk, Belarus

Date	Position
1985-1993	Head of the Laboratory of Mathematical Modeling

ACADEMIC HONOURS

Diploma of Senior Research Fellow, Computer Systems and Networks, High Assessment and Accreditation Commission, Moscow, 1988.

TEACHING at WESTERN UNIVERSITY

List of Courses Taught in Last Six Years

Calculus: 1000B, 1301B
Applied Mathematics: 1411B, 3611F, 3817A, 3817B , 4611F, 4999Z
Statistical Sciences: 1024A, 2141A, 2143B
Financial Modelling: 3817B
Actuarial Sciences 9903B
Software Engineering 2250B

UNDERGRADUATE COURSES taught in Last Ten Years

Date	Course	Name
2017-2018	FM 3817B	Optimization in Finansial Modelling
	Calculus 1301B	Calculus II
2016-2017	Applied Mathematics 3611F	Introduction to Object Oriented Scientific Programming
	Calculus 1301B	Calculus II
	Software Engineering 2250B	Software Construction
2015-2016	Applied Mathematics 3611F	Introduction to Object Oriented Scientific Programming
	Calculus 1301B	Calculus II
	Applied Mathematics 4999Z	Project
2014-2015	Applied Mathematics 4611F	Object Oriented Scientific Programming
	Calculus 1301B	Calculus II
	Statistical Sciences 2141A	Applied Probability and Statistics for Engineers
	Statistical Sciences 2143B	Applied Statistics and Data Analysis for Engineers
	Financial Modelling 3817B	Optimization Methods for Financial Modelling
	Applied Mathematics 4999Z	Project

2013-2014	Applied Mathematics 4611F	Object Oriented Scientific Programming
	Statistical Sciences 2141A	Applied Probability and Statistics for Engineers
	Applied Mathematics 3817B	Optimization
2012-2013	Applied Mathematics 3817A	Optimization
	Statistical Sciences 2141A	Applied Probability and Statistics for Engineers
	Applied Mathematics 4611F	Object Oriented Scientific Programming
	Calculus 1000B	Calculus I
	Applied Mathematics 3817B	Optimization
2011-2012	Applied Mathematics 4611F	Object Oriented Scientific Programming
	Applied Mathematics 1411B	Linear Algebra for Engineers
	Statistical Sciences 1024A	Basic Statistical Methods
2010-2011	Applied Mathematics 4611F	Object Oriented Scientific Programming
2008-2009	Applied Mathematics 4611F	Object Oriented Scientific Programming
2007-2008	Applied Mathematics 1411B	Linear Algebra for Engineers
	Applied Mathematics 050A	Calculus

GRADUATE COURSES Taught in Last Six Years

Date	Course	Name
2016-2017	Applied Mathematics 3611F-GF	Object Oriented Scientific Programming
2014-2015	Applied Mathematics 4611F-GF	Object Oriented Scientific Programming
2013-2014	Applied Mathematics 4611F-GF	Object Oriented Scientific Programming
2012-2013	Actuarial Sciences 9903B	Decision Making and Object Oriented Programming

COURSE DEVELOPMENT

New Undergraduate Course SE 2250B

Date	Course	Name
2016-2017	Software Engineering 2250B	Software Construction

Course Goals and Expectations

This course (C# and Unity) based on scientific foundation of object-oriented programming and its various applications in software engineering. Used C# programming language and Unity Game Engine as the graphics platform. Many powerful features and algorithms introduce for data analysis and visualization, simulations, implementation of classes, methods and objects. That makes the language an ideal platform for software construction, deploying high-performance algorithms, and explore game prototyping environment with 3D Unity and C#.

New Graduate Course AS 9903B

Date	Course	Name
2012-2013	Actuarial Sciences 9903B	Decision Making and Object Oriented Programming

Course Goals and Expectations

High performance algorithms and next generation computing technologies for supporting general and honors undergraduate and graduate programs, as well as postgraduate research projects in statistical & actuarial sciences, applied mathematics and related fields.
This course focuses on data analysis and decision modelling, novel object-oriented techniques in C# and the latest programming environment. It covers optimization, simulations and stochastic modelling, financial and risk models.
Course AS 9903B has been developed and taught in 2013 jointly with Dr. R. Zitikis.

Course project, AM 4999Z "Numerical Laplace Transforms and Inverse Laplace Transforms in Arbitrary Precision", 2015-2016

We concentrate on challenging numerical examples, and examines the issues faced when dealing with periodic functions and singularities. C++ and Matlab arbitrary precision class libraries have played a key role in the calculations. We observe the accuracy of the inversions, as we increase the number of the expansion terms in approximation, and increase the precision level, which ultimately leads to stable solutions.

Course project, AM 4999Z "Monte Carlo and Numerical Laplace Transform Inversion Methods with Applications in Financial Modelling", 2014-2015

This project examines three methods applied to pricing Asian options in finance using numerical Laplace transform inversion, and compares it to the price obtained through simulations. The methods used are Gaver-Stehfest, Talbot and Weeks.
From the numerical results obtained, the equations often will not provide reliable solutions in double precision. As a result, programs using more precise architecture should be used for this inversion problem. Alternatively, simulation approaches can be used, but are very time consuming.
This course was jointly supervised with Dr. D. Jeffrey.

Use of Technology in the Teaching of Mathematics and Related Disciplines On-Line Resources and Software

My work at Western University involves a combination of mathematics with related disciplines and object oriented scientific programming. Courses taught at Applied Mathematics, Statistical & Actuarial Sciences and Electrical and Computer Engineering Departments:

Calculus, Object Oriented Scientific Programming, Probability and Statistics for Engineers, Software Construction, Applied Mathematics for Engineers, Methods of Statistical Analysis, Probability, Optimization, Linear Algebra for Engineers, Stochastic Processes, Operations Research, Applied Regression Analysis, Statistical Computing, Networks and Queues.

Various materials are available for students on my course web sites:
A PDF version of lecture notes for mathematical, statistical and others related courses, a set of C++/C# topics and source codes for object oriented scientific and engineering programming courses (AM 3611F, SE 2250B, AM 4611F, AS 9903B) and optimization courses (AM 3817B, FM 3817B).

The core material is performing statistical data analysis, Monte Carlo simulation, vector-matrix class library, linear and nonlinear optimization, numerical integration and solutions to ordinary differential equations, eigensystems, and advance techniques in Microsoft .NET programming environment.

These are some workspaces (directories), that was specially developed for assignments and projects using C++/C# and Matlab. That allows to gather various source code files and resources and work with them as a cohesive unit.
This software provides students with working environment including practical examples that can be customized and implemented to solve complex scientific and engineering problems.

RECORD of PERFORMANCE in RESEARCH(last fourteen years)

REPRESENTATIVE PUBLICATIONS

Refereed Journal Publications

[1] Krougly, Z., Davison, M., Aiyar, S., The role of high precision arithmetic in calculating numerical Laplace and inverse Laplace transforms, Applied Mathematics, 8 (2017) p. 562-589.

[2] Boychuk, D., Braun, W.J., Kulperger, R.J., Krougly, Z.L., Stanford, D.A., A stochastic model for forest fire growth, Information Systems and Operational Research (Special Issue on Forestry) 45 (2009), p. 9-16.

[3] Boychuk, D., Braun, W.J., Kulperger, R.J., Krougly, Z.L., Stanford, D.A., Stochastic forest fire growth models, Environmental and Ecological Statistics 16 (2009), p. 133-151.

[4] Krougly, Z.L., Creed, I.F., Stanford, D.A., A stochastic model for generating disturbance patterns within landscapes, Computers & Geosciences 35(2009), p. 1451-1459.

[5] McLeod, A.I., Yu, H., Krougly, Z.L., Algorithms for linear time series analysis: with R package, Journal of Statistical Software 23(5) (2007), p. 1-26.

[6] Krougly, Z.L., Stanford, D.A., Iterative algorithms for performance evaluation of closed network models, Performance Evaluation 61 (2005), p. 41-64.

[7] Dimitrov, B.D., Rykov, V.V., Krougly, Z.L., Periodic Poisson processes and almost-lack-of-memory distributions, Automation and Remote Control 65(2004), p. 1597-1610.

Papers in Refereed Conference Proceedings

[8] Krougly, Z., Jeffrey, D., Tsarapkina, D., Software implementation of numerical algorithms in arbitrary precision, 15th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC 2013), Editors: N. Bjorner et al., IEEE Computer Society, (2014), p. 132-138.

[9] Krougly, Z.L., Jeffrey, D.J., Implementation and application of extended precision in Matlab, Proceedings of the Applied Computing Conference ACC '09, Editors: N. Mastorakis et al., WSEAS Press, (2009), p. 103-108.

[10] Kulperger, R.J., Krougly, Z.L., Stanford, D.A., A stochastic forest fire spread model, Proceedings of the 5th Saint Petersburg Workshop on Simulation, St. Petersburg (2005), p. 401-406.

[11] Krougly, Z.L., Glibin, V.V., Experimental data analysis and software applications for indicator spectrophotometric method for the determination of acidic and basic properties of solid surfaces, 87th Canadian Chemistry Conference and Exhibition of the CSC (2004), p. 934.

[12] Dimitrov, B.D., Rykov, V.V., Krougly, Z.L., Periodic non-stationary arrival processes in queuing networks and their characterization, Distributed Computer and Communication Networks (DCCN-2003): Stochastic Modeling and Optimization, Technosphera (2003), Moscow , p. 64-72.

[13] Dimitrov, B.D., Rykov, V.V., Krougly, Z.L., Ghitany, M., On properties and statistical estimation of ALM distributions, Proceedings of Hawaii International Conference on Statistics and Related Fields, Honolulu (2003): (CD ISSN#1539-7211), 6 pages.

[14] Krougly, Z.L., Stanford, D.A., Nonlinear programming algorithms for performance modeling of computer networks Distributed Computer and Communication Networks: Stochastic Modeling and Optimization (DCCN-2003), Technosphera (2003), Moscow, p. 11-22.

SOFTWARE PACKAGES in C++ and C#

List of C++ software packages developed for and used in research an in the aforementioned papers follows.

[1] Numerical Laplace Transforms and Inverse Laplace Transforms in Arbitrary Precision, 2015 - 2017

[8], [9] Multiple precision numerical computing and complex analysis library (MPREC package) (2009-2015)

[9] Matlab double-double precision numerical computing and complex analysis library (DDPREC package) (2009)

[2], [3], [10] Stochastic forest fire simulator (FFSimulator package) (2009).

[4] Terrain disturbance simulator (TDSimulator package) (2009).

[5] Linear time series analysis (ltsa package). R computer code can be download from the following programming resources:
- R source package ltsa, version 1.4.2 (2012), http://CRAN.R-project.org/package=ltsa.
- R source package FGN:Fractional gaussian noise, estimation and simulation, version 1.4 (2011), http://www.jstatsoft.org/v23/i05.

[5], [10] Stochastic modeling of networks and queues (ZEDNED package) (2005).

[6], [12], [13] Almost-lack-of-memory distributions (ALM package) (2004), Revised November 2012.