Georgiy Bobashev, Ph.D.

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Summary

Dr. Georgiy Bobashev, a Senior Research Statistician, has been with RTI since 1998 and is an expert in mathematical modeling and statistical methods. Dr. Bobashev have been directing and managing statistical and mathematical projects that employ both system dynamics and agent-based modeling. He is leading a growing team of mathematical modelers and analysts and providing methodological leadership to project teams of statisticians and programmers. Specific research topic areas have included HIV, influenza, substance use, and violent behavior. In addition to his current duties, Dr. Bobashev is a non-resident fellow at the Brookings Institution Center for Social and Economic Dynamics as well as an adjunct Assistant Professor at North Carolina State University Department of Statistics

I have published thirty peer-reviewed papers and book chapters in these areas.

Primary Professional Interest

Mathematical and simulation modeling of complex epidemiological, clinical and biological processes using systems dynamics and agent-based approaches.

Education

Postdoctoral fellowship at the Departments of Biostatistics and Mental Hygiene, Johns Hopkins University, Baltimore, MD, 1997-1998.
Ph.D., Department of Statistics, Biomathematics program, North Carolina State University, Raleigh, NC, 1997.
M.S., Physics, St. Petersburg Technical University, St. Petersburg, Russia, 1989.

Professional Experience

Research Triangle Institute, RTP, NC. (1998-current)

Business Development

As a project manager for Research Triangle Institute over the past few years Dr. Bobashev has developed a consistent stream of government contract funding for the area of modeling and simulation in collaborative efforts on three multi-year projects involving over $1M each. He is a Principal Investigator on R01 grant from NIH on methamphetamine market research. Past experience also includes multiple contracts with commercial (pharmaceutical) organizations.

Project Management Experience
Dr. Bobashev has been contract project leader in the areas of influenza, substance abuse, HIV transmission, behavior modeling. He has been responsible for administrative, technical, and fiscal aspects of projects. As a statistics director of the Partnership for Genomics and Molecular Epidemiology, he led a group of statisticians and worked closely with biologists and epidemiologists on a number of proteomics, genomics, and metabolomics projects among others.

Technical Expertise
During his career Georgiy Bobashev has acquired a versatile set of statistical and mathematical skills. In modeling he has experience in dynamical systems, process modeling, and agent-based modeling. His expertise in statistical analyses include advanced statistical methodologies for the analysis of complex surveys (GEE, mixed models), data mining methods (neural networks, cluster analysis, CHAID, etc.), as well as genomics/proteomics/metabolomics methods (see the list of publications for more details). As a statistical Task Leader Dr. Bobashev was responsible for the design and implementation of analysis plans for several complex longitudinal multi-site and multi-million dollar intervention projects in the areas of HIV intervention and methadone treatment.

Developed the following new statistical and modeling methods:
- Multivariate predictive methodology that became a basis for an RTI patent application.
- Hybrid equation-based/agent-based modeling concept.
- Method for the estimation of variance components for binary data.
- Method to create population estimates from clinical samples using agent-based modeling.
- Methods to create longitudinal estimates from cross-sectional data using agent-based modeling

Current Research Activities Include
- Project director on social dynamic research in the methamphetamine drug market
- Project director for the estimation of smoking trends among adolescents in the US
- Project director for the development of a simulation model describing the global spread of pandemic influenza and optimal strategies for vaccine/antiviral distribution
- Task leader for building predictive models of neonatal survival
- Development leader of a mathematical modeling project to predict the impact of syringe type on HIV and HCV spread among injecting drug users
- Task leader for the development of statistical models of HIV spread on networks of injecting drug users
- Task leader on the development of a model for predicting group violence

North Carolina State University, Raleigh, NC.
Adjunct Assistant Professor in the Department of Statistics. 2004-current

- Participating in organizing conferences, faculty recruitment, and student awards
- Taught a graduate course (3 credits) on stochastic modeling in 2003

St. Petersburg Agro-physical Research Institute, St. Petersburg, Russia.
Lead Engineer in the Laboratory of Agroecosystems Modeling, 1989-1992

- Applied mathematical and statistical methods to the problems of complex ecosystems development.
- Developed models of heat and moisture transfer in soils
- Developed dynamical models for forecasting of ice formation on airport runways.
- Developed a model of short and long-wave radiation impact on plants.

Professional and Honor Associations

American Public Health Association
College on Problems of Drug Dependence
Sigma Xi
International Health Economics Society
American Classification Society
American Statistical Association
Society for Mathematical Biology

Professional Services

Reviewer for journals.
American Journal of Epidemiology
American Journal of Public Health
Drug and Alcohol Dependence
British Journal of Mathematical and Statistical Psychology
Substance Use and Misuse
PLoS One

Workshop organizer
IHORTA2 Workshop on the analysis of correlated data, China CDC 2008
Mathematical modeling in biological and epidemiological studies of drug addiction, CPDD 2009
Mathematical modeling in HIV research, China CDC 2008
NIDA Symposium on computational modeling in substance abuse, 2008
Mathematical modeling in biological and epidemiological studies of drug addiction, CPDD 2007
Mathematical modeling in biological and epidemiological studies of drug addiction, CPDD 2006
Evaluation of Methadone Treatment in the US, CPDD 2002
Statistical Methods in Substance Abuse Research, CPDD 2000
Statistical Methods in Substance Abuse Research, CPDD 1999

Honors and Awards
RTI Highly Cited Author, 2008
RTI Annual Award, 2008
RTI Early Career Author, 2007
RTI Annual Award, 2007
RTI President's Award 2005
RTI Annual Award, 2004

Selected Publications

Refereed Journal Articles

Subramanian S., Bobashev G.V., Morris J.R., Cost implication of the new colorectal cancer screening guideline: How do we ensure optimal allocation of limited resources? *Health Affairs* (in press 2009)

Hoffer L. and Bobashev G.V. Researching a Local Heroin Market as a Complex Adaptive System. *American Journal of Community Psychology* (in press,2009)

Bobashev G.V., Zule W.A., Osilla K.C., Kline, T.L., Wechsberg W.M., Transactional Sex among High-Risk Men and Women in the South. *Journal of Urban Health* 86:S1, 32-47 (2009)

Zule W.A. , Wechsberg W.M., Bobashev G.V., Costenbader E.C., Cooms C.M., (2009) Behaviorally Bisexual Men and their Risk Behaviors with Men and Women *Journal of Urban Health* 86:S1, 48-62 (2009)

Subramanian S., Bobashev G.V., Morris J.R (2009) Modeling the Cost-Effectiveness of Colorectal Cancer Screening: Policy Guidance Based on Patient Preferences and Compliance. *Cancer Epidemiol Biomarkers Prev* 18: 1971-1978

Zule W.A. and Bobashev G.V., (2009) High Dead-space Syringes and the Risk of HIV and HCV Infection among Injecting Drug Users. *Drug and Alcohol Dependence* 100 (3):204-213.

Bushara, N., Fishbein, D.H., Flannery, B.A., Langevin, D.J., Bobashev, G., Zvartau, E.E., Verbitskaya E.V., Tsoy M.V., Krupitsky E.M., Egorova V.U. (2008). Neurocognitive functioning in patients with different type of abuse. *European Neuropsychopharmacology*, 18:S65-S66

Bobashev G.V., Morris R.J., Goedecke D.M., Sampling for Global Epidemic Models and the Topology of an International Airport Network. PLoS ONE 3(9): e3154 doi:10.1371/journal.pone.0003154 (2008)

Wright D., Bobashev G.V., Folsom, R. Utilizing Variance Components to Understand the Influence of Neighborhood, Family, and the Individual on Drug Use: Analysis from the 1999 National Household Survey on Drug Abuse. *Substance Use and Misuse* (14):2159-71 (2007)

Ahmed S.H., Bobashev G.V., Gutkin B.S., "The Simulation of Addiction: Pharmacological and Neurocomputational Models of Drug Self-administration" *Drug and Alcohol Dependence* 90(2-3):304-311 (2007)

Fishbein, D.H., Flannery B., Krupitsky E., Langevin D., Bobashev G.V., Verbitskaya E., Bland C.R., Bolla K., Zvartau E., Egorova V., Bushara N., and Tsoy M. "Neurocognitive Characterizations of Russian Heroin Addicts Without a Significant History of Other Drug Use." *Drug and Alcohol Dependence* 90(1):25-38. (2007)

Bobashev G.V., Costenbader E.M., Gutkin B.S. Comprehensive Mathematical Modeling in Drug Addiction Sciences *Drug and Alcohol Dependence* 89(1):102-106. (2007)

Epstein J.M., Goedecke D.M., Yu F., Morris R.J., Wagener D.K., Bobashev G.V., Controlling Pandemic Flu: the Value of International Travel Restrictions *PLoS ONE* 2(5): e401. doi:10.1371/journal.pone.0000401. (2007)

Flannery, B., Fishbein D.H., Krupitsky E., Langevin D., Bobashev G.V., Verbitskaya E., Augustine C.B., Bolla K., Zvartau E., Egorova V., Bushara N., and Tsoy M., Gender Differences in Neurocognitive Functioning Among Alcohol Dependent Russia Patients. *Alcoholism: Clinical and Experimental Research*, 31:745-754 (2007)

Wehby G.L., Castilla E.E., Goco N., Rittler M., Costelino V., Javois L., McCarthy A.M., Bobashev G.V., Litavetcz S., Mariona A., Dutra, G., Lopez-Camelo J.S. Orioli I., Murray J.C. "Description of the methodology used in an ongoing pediatric care interventional study of children born with cleft lip and palate in South America." *BMC Pediatrics*, 6:9, 2006

Ambalavanan N, Carlo W. A., Bobashev G.V., Mathias E., Liu B., Poole K., Fanaroff A. A., Stoll B. J., Ehrenkranz R., Wright L. L. "Prediction of Death for Extremely Low Birth Weight Neonates" *Pediatrics*, 2005; 116(6): 1367 - 1373.

Wright D., Bobashev G.V., Novak, S. P. "Decomposing the Total Variation in a Nested Random Effects Model of Neighborhood, Household, and Individual Components When the Dependent Variable is Dichotomous: Implications for Adolescent Marijuana Use" *Drug and Alcohol Dependence* 78(2): 195-204, 2005

Wechsberg W.M., Lam, K.K., Zule, W.A., and Bobashev, G.V. "Efficacy of a Woman-Focused Intervention to Reduce HIV Risk and Increase Self-Sufficiency Among African-American Crack Users." *American Journal of Public Health* 94(7): 1165-1173, 2004

Chaix. B., Merlo J., and Bobashev G. "Detecting Patterns of Occupational Illness Clustering With Alternating Logistic Regressions Applied to Longitudinal Data." Letter to Editor, *American Journal of Epidemiology* 160(5): 505 – 506, 2004

Bobashev G.V., Das S., Das A. "Experimental Design for Gene Microarray Experiments and Differential Expression Analysis", pp.23-31 in Methods of Microarray Data Analysis II, S. Lin and K. Johnson, ed., Kluwer, 2002

Delva, J., G.V. Bobashev, G. Gonsalez, M. Cedeno, and J.C. Anthony. "Clusters of Drug Involvement in Panama: Results from Panama's 1996 National Youth Survey." *Drug and Alcohol Dependence.* Vol. 60, No. 3, pp. 251-258., 2000

Bobashev, G.V. and J.C. Anthony. "Use of Alternating Logistic Regression in Studies of Drug Use Clustering." *Substance Use and Misuse*. Vol. 35(6&7), pp. 245-267, 2000.

Bobashev, G.V., Ellner S., Nychka D.W., and Grenfell B.. "Reconstruction of Susceptible and Recruitment Dynamics from Measles Epidemic Data." *Mathematical Population Studies*, Vol. 8(1), pp. 1-29. 2000

Bobashev, G.V., and Anthony J.C. "Clusters of Marijuana Use in the U.S." *American Journal of Epidemiology*, Vol. 148, No. 12, pp. 1168-1174, 1998

Ellner, S., B. Bailey, Bobashev G.V., Gallant A.R. , Grenfell B., and Nychka D.W. "Noise and Nonlinearity in Epidemics: Combining Statistical and Mechanistic Modeling to Characterize and Forecast Population Dynamics."*American Naturalist*, 151-5, pp. 425-440, 1998

Bobashev G.V., Khodzhaev K.S. "Systems integrated in the first approximation of the method of averaging" *Applied Mechanics and Machine Technology*, Vol 3, pp 20-26, 1997 (in Russian)

Refereed Book Chapters

Bobashev, G. V. & Borshchev A. V. (in press, 2009). Projecting health care factors into future outcomes with agent-based modeling. In R. Paranjape (Ed.), *Multi-agent systems for health care simulation and modeling*. IGI Global, pp.

Bobashev G.V., Ellner S.P., Bailey B.A. "Improved Forecast with a Combination of Mechanistic and Statistical Predictive Models" Technosocial Predictive Analytics, AAAI Press, 2009 pp. 1-5 http://www.aaai.org/Papers/Symposia/Spring/2009/SS-09-09/SS09-09-001.pdf

Bobashev G.V., Morris R.J., Zule W.A., Borshchev A.V., Hoffer L. (2009). The Use of Agent-based Modeling in Projecting risk factors into the future. In H. Liu, J. Salerno, M. Young, (Eds) *Social Computing and Behavioral Modeling*. Springer, pp 50-54.

Bobashev, G. V. (2008). Type I error. Encyclopedia of survey research methods. Sage.

Bobashev, G. V. (2008). Type II error. *Encyclopedia of survey research methods*. Sage.

Bobashev, G. V., Das, S., & Das, A. (2002). Experimental design for gene microarray experiments and differential expression analysis. In S. Lin & K. Johnson (Eds.), *Methods of microarray data analysis II*. pp. 23–31.

Conference Proceedings

Hoffer L., Bobashev G., Morris R.J. Simulating Patterns of Heroin Addiction within the Social Context of a Local Heroin Market. Proceedings of the ESSA conference University of Surrey, Guilford, UK (2009)

Goedecke D.M., Bobashev G.V., Yu F., "A Stochastic Equation-Based Model of the Value of International Air-Travel Restrictions for Controlling Pandemic Flu", *Proceedings of the Winter Simulation Conference*, Washington, DC 2007. http://www.informs-sim.org/wsc07papers/187.pdf

Bobashev G.V., Epstein J.M., Goedecke D.M. and Feng Yu, A Hybrid Epidemic Model: Combining the Advantages of Agent-based and Equation-based Approaches *Winter Simulation Conference Proceedings* 2007. http://www.informs-sim.org/wsc07papers/186.pdf

Bobashev G.V., Whisnant C.C., Riggs M., Yu F., Basta P.V., Talley D.L., and Clayton A. Accounting for Missing Value Patterns in the Analysis of Protein Differential Expression Using 2D Gel Technology. *JSM Proceedings*, San Francisco 2002.

Licata A.C. and Bobashev G.V. "A Summary of the Various Statistical Methods Currently in Use for the Analysis of Gene Expression Microarray Data" *Proceedings of a Joint Statistical Meeting*, New York, 2002.

Bobashev G.V., Morgan K., Benavides G., Westlake M., Hong N. "Assessment of Error Models From Microarray Data" *Proceedings of a Joint Statistical Meeting*, New York, 2002.

Cornwell, P. D., Anderson, S. P., Bobashev, G. V., and Corton, J. C. Characterizing the mouse liver tumor response through expression profile analysis. *Toxicol. Sci.* 66 (1): 63. 2002.

Zahner G., Teagle S., Harrod J., Burgess L., and Bobashev G. V. "Epidemiology of Child Psychopathology and Mental Health Service Use in Rural Maine Year One Findings."

Proceedings of 13th Annual Research Conference A System of Care for Children's Mental Health: Expanding the Research Base. Tampa, 2000.

Bobashev G. V. , Zahner G. , Freeman D. , and Biemer P., "Estimating prevalence of Health and Behavioral Outcomes Among Survey Non-respondents in a Epidemiology of Child Psychopathology Survey in Rural Maine." *Proceedings of a Joint Statistical Meeting,* Indianapolis, 2000.

Stoll, B.J., Bauer C.R. , Bobashev G.V. , Tyson J.E. , Poole K. , Wright L.L. , Papile L-A. , Korones S.B., and Lemons J.A. "Infants at the Limit of Viability: 401-700 Grams at Birth." *Pediatric Research,* APS/SPR Program Issue and Abstracts, p. 1504. 1999

Invited Presentations

Bobashev G.V., Toward Comprehensive Mathematical Modeling in Studies of Drug Addiction. Presented at the NIDA Symposium on computational modeling in substance abuse, 2008.

Bobashev G.V., Epstein J.M., Goedecke D.M. and Feng Yu, A Hybrid Epidemic Model: Combining the Advantages of Agent-based and Equation-based Approaches. *Presented at Winter Simulation Conference, Washington, DC, 2007*

Bobashev G.V., Goedecke D.M., Costenbader E., Zule W.M Comprehensive mathematical model of HIV/STD spread in communities. *Presented at JSM*, Seattle WA, 2006

Bobashev G.V., Goedecke D.M., Costenbader E., Morris R.J., Zule W.M. Scalable Mathematical Models of Substance Use: From Social Networks to Whole Populations. *Presented at College on Problems of Drug Dependence (CPDD) Workshop*, Scottsdale AZ, 2006

Bobashev G.V., Goedecke D.M., Costenbader E., Zule W.M. Mathematical model of HIV/STD spread in a community with embedded sexual, drug and social networks. *Presented at AIDS/HIV and Public Health*, St.-Petersburg, Russia, 2006

Bobashev G.V., Zule W.A, Root E.D., Wechsberg W.M., Borschev A. V. and Filippov A.E. Geographically-Enhanced Mathematical Models of HIV Dynamics. *Presented at NIDA Symposium on AIDS, Cancer and Related Problems*, St.-Petersburg, Russia, May 26, 2004.

Bobashev, G. V., Hall D., Roayaei J.(2001)."Analysis of Gene Expression (Microarray) Data. Statistician's and Biologist's Approaches." *Triangle Microarray User's Group meeting (TAUG)*

Bobashev G.V., Zhiwei Zhang, and Wright D. " MlwiN Limitations and Technical Issues in Variance Decomposition of Binary Data". *Washington Statistical Society, Washington, DC, 2000*.

Bobashev G.V., Anthony J. C. "Application of Alternating Logistic Regression to the Problems of Drug Use Clustering." College on Problems of Drug Dependence, San Juan, 2000.

Technical Reports

Bobashev G. V., Bhapat N., (2009) Agent-based modeling and the prediction of violent behavior. Prepared for the DHS/HFD

Levine B., Hollywood J., Singer J., Bobashev G. V., Canmer S., (2009) Review of Bayesian Analysis of Competing Hypotheses Methodology. Prepared for the DHS/HFD

Hollywood J., Singer J., Rowe B., Bobashev G. V., (2009) Key variables for VIMS models. Prepared for the DHS/HFD

Bobashev G. V., Goedecke, M. D., Morris, J. R., Epstein, J., & MacKibbin, W. (2008). Modeling global vaccine distribution strategies for containment and mitigation of pandemic influenza. Prepared for the World Health Organization.

Bobashev, G. V., Goedecke, M. D., Morris, J. R., & Yu, F. (2007). Modification of a Global Epidemic Model (GEM) to assure connection with LINKAGE Economic Model. Prepared for the World Bank.

Bobashev, G.V., Zhang, F., Iriondo Perez, J., Black, S.M., & Williams, R.L. . (2006). Clinical and Genetic Data Analysis. Prepared for N/A. Confidential Client. Project Number: 097503.

Zhang, F., Bobashev, G.V., Iriondo Perez, J., Black, S.M. . (2005). Genomewide Association Analysis. Prepared for N/A. Confidential Client. Project Number: 097503.

Batts K, Wagener D. and Bobashev G.V. (2004) "Epidemiology and Genetics of Alcoholism" Confidential client

Wechsberg, W.M., Kasten, J.J., Bobashev, G.V., Zarkin, G.A., Berkman, N.D., Roussel, A.E., Crum, L., Dunlap, L.J., Flannery, B., & Fulmer, E.B. (2003). The Opioid Accreditation Evaluation Study: Results and implications. RTI Report. Prepared for the Center for Substance Abuse Treatment.

Mowery, P.D., Bobashev, G.V., Boyle, K.J., Hansen, N.I., Sutton, B.C., Laird, G.H., Green, A., & Wells, H.E. (2001). Refinement of the OSH Modified Life Table Model for Projecting Smoking Attributable Mortality. Prepared for Office on Smoking and Health, Centers for Disease Control and Prevention.

Mowery, P., Bobashev, G. V., Boyle, K., Hansen, N., & Sutton B. (2000). Refinement of the OSH Modified Life Table Model for Projecting Smoking Attributable Mortality. RTI Report. Prepared for the Centers for Disease Control and Prevention.

Sanchez, R. P., Dunteman, G. H., Bobashev, G., Weimer, B. J., & Bray, R. M. (1999). Estimating substance abuse treatment needs using social indicators. Report prepared for the South Dakota Department of Human Services, Division of Alcohol and Drug Abuse (Contract No. CSAT 270-95- 0028 from Center for Substance Abuse Treatment to the State of South Dakota), RTI Report 6528-040

[August 2009]