

OLGA VITEK

August 21, 2006

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Assistant Professor
Dpt. of Statistics, Purdue University
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Research interests

- *Bioinformatics and computational molecular biology*
 - analysis of protein nuclear magnetic resonance (NMR) spectra for structural genomics
 - identification and quantitation of proteins for mass spectrometry based proteomics
 - learning the structure of biological networks
- *Statistical computing*
 - learning from highly-dimensional data
 - combinatorial optimisation algorithms
- *Applied statistics*
 - probabilistic modeling for biological data
 - design and analysis of experiments
 - statistical consulting

Education

- 2005* Ph.D in Statistics, PURDUE UNIVERSITY, USA.
Thesis: “*An inferential approach to protein backbone nuclear magnetic resonance assignment*”.
Co-supervised by B. A. Craig, Department of Statistics, Purdue University and C. Bailey-Kellogg, Department of Computer Science, Dartmouth College.
- 2001* M.Sc. in Mathematical Statistics, PURDUE UNIVERSITY, USA.
- 1997* M.Sc. in Econometrics and Statistics, UNIVERSITY OF GENEVA, Switzerland.
Thesis: “*Tree-Based Classifiers with Application to Medical Data*”.
Supervised by E. Ronchetti.
- 1995* B.Sc. in Econometrics and Statistics, UNIVERSITY OF GENEVA, Switzerland.

Employment

- 08/06* Assistant Professor in Statistics and Computer Science PURDUE UNIVERSITY, West Lafayette IN, USA.
- *present*
- 05/05* Post-doctoral fellow. INSTITUTE FOR SYSTEMS BIOLOGY, Seattle WA, USA.
- *08/06*
- Non-labeling relative quantitation in mass spectrometry based proteomics. Supervisor R. Aebersold.
- 05/04* Summer intern, proteomics group. ELI LILLY AND COMPANY, Indianapolis IN, USA.
- *08/04*
- Inferential protein identification from tandem mass spectra. Supervisor R. K. Julian.
 - Optimization of protein identification from tandem mass spectra using statistical design of experiments. Supervisor R. K. Julian.
- 01/01* Research assistant. PURDUE UNIVERSITY, West Lafayette IN, USA.
- *05/05*
- Assessment of uncertainty in analysis of protein NMR spectra. In collaboration with C. Post, Medicinal Chemistry and Molecular Pharmacology.
 - Statistical inference for protein structure discrimination using cross-linking experiments and mass spectrometry. In collaboration with A. Friedman, Biology.
 - Design and analysis of experiments to study sequence-to-reactivity properties of protein inhibitors. In collaboration with M. Laskowski, Physical Biochemistry.
 - Design and analysis of microarray experiments. Supervisor J. Fleet, Foods and Nutrition.
 - Design and analysis of microarray experiments. Supervisor L. McIntyre, Agronomy.
- 06/00* Member of the Statistical Consulting Service. PURDUE UNIVERSITY, USA.
- *12/00*
- Design and analysis of experiments in genetics, pharmacy and life sciences.
 - Design of sampling plans for quality control in industry.
- 09/96* Teaching assistant. UNIVERSITY OF GENEVA, Switzerland.
- *07/99*
- Recitations and grading for courses:
- “Introduction to Probability and Statistics”
 - “Econometric modeling”
- 06/97* Statistician, UNIVERSITY HOSPITALS, Geneva, Switzerland.
- *06/98*
- Analyses of data for a large-scale European project in clinical epidemiology.
 - Instructor in a continuing education class “Statistical modeling”.
- 03/96* Member of Laboratory of Applied Economics. UNIVERSITY OF GENEVA, Switzerland.
- *03/97*
- Modeling the outcome of postoperative treatment of patients in Canton Vaud, Switzerland.

Awards

- 2005 Institute of Mathematical Statistics Laha Travel Award to present at the Joint Statistical Meetings in Minneapolis, MN.
- 2004 Graduate School Dissertation Fellowship. Purdue University.
- 2003 Charlie Sampson Best Poster Award. 26th annual Midwest Biopharmaceutical Statistics Workshop, Ball State University.
- 1997 Price of the Industrial Services of Geneva for work encouraging rational use of energy. Geneva, Switzerland.

Travel Grants

- 2005 Travel grant to present at the New Researchers Conference, Seattle, WA.
- 2005 Travel grant to present at the Workshop on Statistics in Genomics and Proteomics, Monte Estoril, Portugal.
- 2005 Travel grant to present at the 2nd IMS-ISBA joint meeting at Bormio, Italy.
- 2004 Travel grant to present at the Gordon Research Conference on Computational Aspects of Biomolecular NMR at Ventura, CA.
- 2003 Travel grant to present at the International Workshop on Bayesian Data Analysis at UC Santa Cruz.
- 2003 Travel grant to present at the 26th annual Midwest Biopharmaceutical Statistics Workshop, Ball State University.
- 2001 Travel Award of the Graduate Student Association of Purdue University to present at the Joint Statistical Meetings in Atlanta, GA.

Publications in bioinformatics and computational biology

1. O. Vitek, C. Bailey-Kellogg, B. Craig, J. Vitek. "Inferential backbone assignment for sparse data". *Journal of Biomolecular NMR*, in press.
2. Z. Yi, O. Vitek, M. A. Qasim, S. M. Lu, W. Lu, M. Ranjbar, J. Li, M. C. Laskowski, C. Bailey-Kellogg, M. Laskowski. "Functional evolution within protein superfamilies". *Proteins*, 63, p.697-708, 2006.
3. O. Vitek, C. Bailey-Kellogg, B. A. Craig, P. Kuliniewicz, J. Vitek. "Reconsidering complete search algorithms for protein backbone NMR assignment". *Bioinformatics*, 21, p.ii230-ii236, 2005.
4. L. S. Riter, O. Vitek, K. M. Gooding, B. D. Hodge, R. K. Julian, Jr. "Statistical design of experiments as a tool in mass spectrometry". *Journal of Mass Spectrometry*, 40, p.565-579,

2005.

5. O. Vitek, J. Vitek, B. A. Craig, C. Bailey-Kellogg. "Model-based assignment and inference of protein backbone nuclear magnetic resonances", *Statistical Applications in Genetics and Molecular Biology*, 3, Article 6, 2004.
6. B. A. Craig, O. Vitek, M. A. Black, M. Tanurdzic, R. W. Doerge. "Designing microarrays." In *Proceedings of Applied Statistics in Agriculture, Kansas State University*, edited by George Milliken, p.159-182, 2001.

Collaborative publications and consulting

1. J. C. Fleet, L. Wang, O. Vitek, B. A. Craig, H. J. Edenberg. "Gene Expression Profiling of Caco-2 BBe Cells Suggests a Role for Specific Signaling Pathways during Intestinal Differentiation", *Physiological Genomics*, 13, p.57-68, 2003.
2. T. V. Perneger, A.-C. Raë, J.-M. Gaspoz, F. Borst, O. Vitek, C. Héliot. "Screening for pressure ulcer risk in an acute care hospital: Development of a brief bedside scale". *Journal of Clinical Epidemiology*, 55, p.498-504, 2002.
3. O. Vitek, B. A. Craig, R. Becker. "Statistical sampling plan for monitoring egg quality in an egg breaking plant". *Technical Assistance Program*, Purdue University, 2000.
4. O. Vitek, B. A. Craig, R. Becker. "Statistical sampling plan for monitoring the quality of seed lots". *Technical Assistance Program*, Purdue University, 2000.
5. S. Beer-Borst, A. Morabia, S. Hercberg, O. Vitek, M. S. Bernstein, P. Galan, R. Galasso, S. Giampaoli, S. Houterman, E. McCrum, S. Panico, F. Pannozzo, P. Preziosi, L. Ribas, L. Serra-Majem, W. M. M. Verschuren, J. Yarnell, M. E. Northridge. "Obesity and other health determinants across Europe: The Euralim Project". *Journal of Epidemiology and Community Health*, 54, p.424-430, 2000.
6. S. Beer-Borst, S. Hercberg, A. Morabia, M. S. Bernstein, P. Galan, R. Galasso, S. Giampaoli, E. McCrum, S. Panico, P. Preziosi, L. Ribas, L. Serra-Majem, M. F. Vescio, O. Vitek, J. Yarnell, M. E. Northridge. "Dietary patterns in six European populations: results from Euralim, a collaborative European data harmonization and information campaign". *European Journal of Clinical Nutrition*, 54, p.253-262, 2000.
7. S. Beer-Borst, A. Morabia, S. Hercberg, O. Vitek, M. S. Bernstein, P. Galan, R. Galasso, S. Giampaoli, S. Houterman, E. McCrum, S. Panico, F. Pannozzo, P. Preziosi, L. Ribas, L. Serra-Majem, W. M. M. Verschuren, J. Yarnell, M. E. Northridge. "Nutrition and Heart". *Information brochures for general public and for health professionals*. University Hospital, Geneva, Switzerland, 1998.
8. G. Antille Gaillard, N. Chavaz, E. El May, E. Ronchetti and O. Ryndina¹, "Evaluation of postoperative improvement in functional autonomy in Treatment and Rehabilitation Centers of Canton Vaud, Switzerland" (in French). *Laboratory of Applied Economics*. University of Geneva, Switzerland, 1998.

Dissertations

1. O. Vitek “An inferential approach to protein backbone nuclear magnetic resonance assignment”. *Ph.D. dissertation*. Purdue University, USA, 2005.
2. O. Ryndina¹ “Tree-based classifiers with application to medical data”. *M.Sc. dissertation*. University of Geneva, Switzerland, 1997.
3. O. Ryndina¹, D. Kustrimovic and M. Pfenninger, “Assessing fuel efficiency of cars on the Swiss market” (in French). *B.Sc. diploma project and CUEPE technical report 98.02*. University of Geneva, Switzerland, 1996.

Software

MBA (Model-Based Assignment). A software for inferential assignment of protein backbone nuclear magnetic resonances. Implemented in Java, 7'000 lines.
<http://www.stat.purdue.edu/~ovitek/mba/mba.html>

Invited presentations

1. “Stochastic search in highly dimensional constrained graphical models with application to protein backbone NMR assignment”. Poster at the *Workshop on Random Graphs and Stochastic Computation*, Statistical and Applied Mathematical Sciences Institute (SAMSI), NC, 2005.
2. “A scalable inferential approach to protein backbone nuclear magnetic resonance assignment”. Talk at the *Bioinformatics and statistical genetics seminar series*, Purdue University, 2005.
3. “Inferential analysis of protein Nuclear Magnetic Resonance (NMR) spectra”. Talk at the *Computational Laboratory, ETHZ*, Switzerland, 2005.

Contributed talks

1. “Model search in highly dimensional constrained graphical models with application to protein backbone NMR assignment”. *Joint Statistical Meeting*, Minneapolis, 2005.
2. “Inferential analysis of protein Nuclear Magnetic Resonance (NMR) spectra”. *Eastern North American Region (ENAR) meeting of the International Biometric Society*, Pittsburgh, 2004.
3. “Model-based analysis of protein backbone NMR”. *Joint Statistical Meeting*, San Francisco, 2003.

¹Published as Olga Ryndina prior to 1999.

4. “Statistical issues in protein structure determination by nuclear magnetic resonance spectroscopy (NMR)”. *Bioinformatics and statistical genetics seminar series*. Purdue University, 2002.
5. “Gene expression profiling of intestinal cell differentiation: biological and statistical issues”. *Bioinformatics and statistical genetics seminar series*. Purdue University, 2002.
6. “Designing microarray experiments: chips, dips, flips, and skips”, *Bioinformatics and statistical genetics seminar series*. Purdue University, 2000.

Contributed posters

1. “A comparative study of computational tools for LC-MS based proteomics”. *Workshop on Statistics in Genomics and Proteomics*, Monte Estoril, Portugal, 2005.
2. “An inferential approach to protein backbone nuclear magnetic resonance assignment”. *2nd IMS-ISBA joint meeting*, Bormio, Italy, 2005.
3. “An empirical Bayes approach for protein identification from tandem mass spectra”. *INGEN Proteomics Symposium*, Bloomington, Indiana, 2004.
4. “Model-based assignment and inference of protein backbone nuclear magnetic resonances”. *Gordon Research Conference on Computational Aspects of Biomolecular NMR*. Ventura, California, 2004.
5. “Model-based analysis of protein backbone NMR for structural genomics”. *Seventh Workshop on Case Studies of Bayesian Statistics*, Carnegie Mellon University, 2003.
6. “Model-based analysis of protein backbone NMR for structural genomics”. *International Workshop on Bayesian Data Analysis*, University of California at Santa Cruz, 2003.
7. “Assessment of uncertainty in protein backbone NMR assignments using Bayesian model averaging”. *26th annual Midwest Biopharmaceutical Statistics Workshop*, Ball State University, 2003.
8. “Statistical issues in protein structure determination by nuclear magnetic resonance spectroscopy (NMR)”. *INGEN Proteomics Symposium*, Indianapolis, 2002.

Referee

- Bioinformatics
- IEEE Transactions on Signal Processing
- Molecular and Cellular Proteomics
- Physiological Genomics

Professional memberships

American Statistical Association

International Biometrics society, East-North Americal Region (ENAR)

International Mathematical Society

International Society of Bayesian Analysis

International Society for Computational Biology

Other information

Citizen of Russia, permanent resident of the United States.

Fluent English, French and Russian.