

## DANIEL YORGOV

Department of Mathematical Sciences  
Indiana University – Purdue University Fort Wayne  
Kettler Hall, 2101 E. Coliseum Blvd., KT 277  
Fort Wayne, IN 46805

Tel.: 260-481-6222  
Cell: 260-209-0550  
E-mail: [yorgovd@ipfw.edu](mailto:yorgovd@ipfw.edu)  
Web: <http://users.ipfw.edu/yorgovd/>

### Education

---

#### **Ph.D., Applied Mathematics, Concentration in Statistics** (2016)

Department of Mathematical and Statistical Sciences, University of Colorado, Denver, CO  
Thesis Title: Combined Admixture and Association Mapping for Complex Traits  
Thesis Advisor: Dr. Stephanie A. Santorico

**M.S., Mathematical Sciences** (2006) Michigan Technological University, Houghton, MI

**M.A., Finance** (2003), **B.A., Banking** (2001) University of Economics, Varna, Bulgaria

### Research Interests

---

#### Statistical Genetics and Computational Genomics

- Statistical methods for combining admixture mapping and association for population and family designs
- Linear mixed models; adjusting for the effect of population stratification
- Local ancestry assignment and imputation in admixed individuals; MCMC and machine learning approaches
- Collaborative work on the autoimmune vitiligo disease; polygenic prediction

#### High-Performance Computing (> 6.5 mln. CPU core hours utilized; mostly at Janus supercomputer at CU Boulder)

- HPC pipelines for genetic studies
- Efficient search algorithms for discrete combinatorial structures
- GPU/CUDA implementations

### Publications

---

#### Peer Reviewed:

1. Jin Y, Anderson G, Yorgov D, Ferrara TM, Ben S, Brownson KM, ..., Santorico SA, & Spritz RA: Genome-wide association studies of autoimmune vitiligo identify 23 new risk loci and highlight key pathways and regulatory variants. *Nat. Genet.* 2016; 48(11): 1418-24.
2. Cavalli G, Hayashi M, Jin Y, Yorgov D, Santorico SA, Holcomb C, Rastrou M, Erlich H, Tengesdal IW, Dagna L, Neff CP, Palmer BE, Spritz RA, Dinarello CA: MHC class II super-enhancer increases surface expression of HLA-DR and HLA-DQ and affects cytokine production in autoimmune vitiligo. *Proc Natl Acad Sci U S A* 2016; 113(5):1363-8.
3. Hayashi M, Jin Y, Yorgov D, Santorico SA, Hagman J, Ferrara TM, Jones KL, Cavalli G, Dinarello CA, Spritz RA: Autoimmune vitiligo is associated with gain-of-function by a transcriptional regulator that elevates expression of HLA-A\*02:01 in vivo. *Proc Natl Acad Sci U S A* 2016; 113(5):1357-62.
4. Yorgov V and Yorgov D: The Automorphism Group of a Self-Dual [72, 36, 16] Code does not contain  $Z_4$ . *IEEE Trans. Inf. Theory* 2014; 60(6):3302-3307.
5. Yorgov D, Edwards KL, Santorico SA: Use of admixture and association for detection of quantitative trait loci in the type 2 diabetes genetic exploration by next-generation sequencing in ethnic samples (T2D-GENES) study. *BMC Proc* 2014; 8(S1):S6.

#### Submitted:

6. Yorgov D and Santorico SA. High Resolution Simulated Latino Genomes with Inferred Continental Ancestral Origins and a Native American Reference Panel. Submitted to PLOS One.

## In Preparation:

7. Paul S, Yorgov D, Spritz RA, Santorico SA. Genetic Risk Prediction Based on Confirmed Loci Outperforms Performance of Polygenic Risk Scores for Generalized Vitiligo. Frist draft preparation. Target Journal: Journal of Investigative Dermatology.
8. Yorgov V and Yorgov D: On the Binary Self-Dual Codes with Automorphism of Order Three. Frist draft preparation. Target journal: IEEE Trans. Inf. Theory.
9. Yorgov D and Santorico SA. Combined Admixture and Association Mapping after Imputation. Control for Confounding in Admixed Samples with Complex Genetic Correlations. Target journal: Gen. Epi.
10. Santorico SA, Paul S, Yorgov D, Spritz RA. Optimized Genetic Risk Prediction for Generalized Vitiligo Incorporating Age of Onset and Subtyping.

## Scholarships and Awards

---

- Yorgov, D. *Machine Learning Disease Prediction via Neural Networks*, Purdue Research Foundation, Summer Faculty Grant, funded for summer 2018: estimated \$ 9500
- Principal Investigator for *The IPFW Actuarial Science Program's Next Phase*, Lincoln Financial Foundation Academic Support Grant. Co-PIs: Dr. Yihao Deng and Joe Francis. Funded for 2017-18 academic year: \$35000
- Yorgov, D. *Incorporating Ancestral Information in Genome-Wide Association Studies*, Purdue Research Foundation, Summer Faculty Grant, funded for summer 2017: \$ 9511.54
- Advanced Gene Mapping Course *Travel Fellowship*, Rockefeller University, New York, Spring 2014, \$800
- Bateman Memorial Fellowship, University of Colorado Denver (*full support* for 2013-2014 academic year)
- Summer Institute in Statistical Genetics *Tuition and Travel Scholarships*, University of Washington (2013 and 2012)
- Bateman Memorial *Outstanding Graduate Student Teaching Award*, University of Colorado Denver (2012)
- Bateman Memorial *Teaching Assistantship*, University of Colorado Denver (Fall 2010 – Spring 2013)
- *Top Student Award* (2 courses), Michigan Technological University, Houghton, MI (Fall 2009, Spring 2010)

## Professional Experience

---

- Aug 2016 – present     **Assistant Professor of Applied Statistics**  
Department of Mathematical Sciences, Purdue University Fort Wayne, IN
- June 2014 – June 2016   **Graduate Research Assistant (NIH funded)**  
Department of Mathematical and Statistical Sciences, University of Colorado, Denver, CO  
- work on the Vitiligo project (<https://vitiligoover.com/dr-spritzs-vitiligo-genetic-study/>)
- Aug 2010 – July 2013   **Graduate Teaching Instructor**  
Department of Mathematical and Statistical Sciences, University of Colorado, Denver, CO  
Courses taught as instructor of record: *Mathematics for Liberal Arts, Polynomial Calculus, Calculus II, Introductory Statistics, and Applied Linear Algebra*
- Jan 2005 – May 2010    **Graduate Teaching Instructor**  
Department of Mathematical Sciences, Michigan Technological University, Houghton, MI  
Courses taught as instructor of record: *Data, Functions and Graphs, Calculus I Plus, Calculus II, Elementary Linear Algebra, and Elementary Differential Equations*
- Sept 2004 – Dec 2004   **Graduate Teaching Assistant**  
Department of Mathematical Sciences, Michigan Technological University, Houghton, MI  
*Joint recitation sessions and grading support for Multivariable Calculus with Technology*

**Various Computing Related Industrial Experiences, Bulgaria:** System Administrator; programming and computer related consulting work; sole proprietorship: leasing, sale, software and hardware PC support; Graphic Designer and Lead Graphic Designer for TV post-production and pre-press; Software Sales Manager at an Apple dealership

## Presentations and Talks

---

IPFW Mathematical Sciences New Student Orientation (8/18/2017)

- *The New B.S. Data Science and Applied Statistics Degree*

CU Denver, Downtown Statistical Genetics Seminar (11/20/2015)

- *Intro to High Performance Computing and Janus Supercomputer Tutorial*

Butcher Symposium 2015, Westminster, CO, poster (11/6/2015)

- *Combined Association and Admixture Mapping*

Fall 2015 CO/WY ASA meeting, Aurora, CO (10/16/2015)

- *Augmented Genome-Wide Association Studies of Autoimmune Vitiligo Disorder Identify 25 Novel Chromosome Locations*

CU Denver, Downtown Statistical Genetics Seminar (5/22/2015)

- *Research in Progress: Admixture Mapping and Simulations*

17th Annual Research & Creative Activities Symposium University of Colorado Denver, poster (4/25/2014)

- *Combined Association and Admixture Mapping for Complex Traits*

Statistical Genetics / Genetic Epidemiology journal club paper presentation, Aurora, CO (2/6/2014)

- doi:10.1038/srep01815, *The Benefits of Selecting Phenotype-specific Variants for Applications of Mixed Models in Genomics*

CU Denver, Downtown Statistics Seminar (10/10/2013)

- *Admixture mapping*

ASA's CO/WY Chapter American Statistical Association Fall Meeting, Aurora, CO (10/18/2013)

- *Combined Association and Admixture Mapping for Complex Traits*

Genetic Analysis Workshop 18, Stevenson, Washington (10/14/2012)

- *Admixture Mapping group; contribution: Use of Admixture and Association for Detection of QTL*

Seminar on Emerging Computational Tools, Mathematical Sciences, Michigan Technological University, Houghton:

- *Registers Use and Built-in Functions* (6/23/2009)
- *CUDA Architecture, Memory Types* (5/19/2009)
- *Registers Usage, Compiler options, CUDA Occupancy Calculator* (4/16/2009)
- *Exhaustive search construction of small binary code. Code optimization* 4/9/2009)

MAA's Fall Upper Peninsula Zonal Meeting, Lake Superior State University, Sault Ste. Marie, MI (9/12/2008)

- *CUDA-Based Exhaustive Search Construction of Golay Binary [24, 12, 8] Self-Dual Code*

## Meeting Abstracts

---

October 2016, IGES2016: *A Comparison of Genetic Risk Prediction and Subtyping for Generalized Vitiligo*, The 2016 Annual Meeting of the International Genetic Epidemiology Society, Abstract published in Genetic Epidemiology 40, No. 7 (2016)

October 2016, ASHG2016: *Effects of Imputation on Combined Admixture and Association Mapping*; Yorgov D, Santorico SA (Abstract/Program #574), The 2016 Annual Meeting of the American Society of Human Genetics, October 18-22, Vancouver, BC, Canada

October 2016, ASHG2016: *Genetic risk prediction and subtyping for generalized vitiligo*. (Abstract/Program # 1301), The 2016 Annual Meeting of the American Society of Human Genetics, October 18-22, Vancouver, BC, Canada

October 2015, IGES2015: *Optimized genetic risk prediction for vitiligo and its use to define disease subtypes*; Santorico SA, J Ying, Yorgov D, Paul S, Ferrara T, Spritz RA

October 2015, ASHG2015: *Genome-wide association studies of vitiligo implicate 100 loci in disease risk*; Santorico SA, J Ying, Yorgov D, Ferrara T, Spritz RA

## **Classes Taught as Instructor of Record with Full Course Responsibility**

---

### **IPFW**

STAT 125 – Communicating with Statistics	Fall 2016 (2 sections), Spring 2017
STAT 240 – Statistical Methods for Biology	Spring 2017, Spring 2018
STAT 516 – Basic Probability and Applications	Fall 2016, Fall 2017
STAT 517 – Statistical Inference	Spring 2017, Spring 2018

### **CU Denver**

MATH 1010 – Mathematics for Liberal Arts	Summer 2011, Fall 2012
MATH 1080 – Polynomial Calculus (Common Final)	Fall 2010
MATH 2411 – Calculus II (Common Final)	Fall 2011, Spring 2012
MATH 2830 – Introductory Statistics	Summer 2011, Summer 2012 (online)
MATH 3191 – Applied Linear Algebra	Spring 2011, Spring 2013, Summer 2013

### **Michigan Tech**

MA1032 – Data, Functions & Graphs (Common Final)	Fall 2005, Fall 2006, Fall 2009 (2 sections)
MA1151 – Calculus I Plus	Spring 2005
MA2160 – Calculus with Technology II (Common Final)	Spring 2006, Spring 2007, Fall 2007, Spring 2008 (2 sections), Summer 2009, Spring 2010
MA2320 – Elementary Linear Algebra	Summer 2006, Summer 2008, Spring 2009
MA2321 – Elementary Linear Algebra	Spring 2009 (150 students end-of-course enrollment)
MA3520 – Elementary Differential Equations	Summer 2005, Summer 2007, Fall 2008 (135 students end-of-course enrollment)

For student evaluations, please see <http://users.ipfw.edu/yorgovd/teaching.html>.

## **Professional Memberships**

---

American Statistical Association; American Society of Human Genetics

## **Service**

---

### **Professional:**

- Ad-hoc referee for PLOS One (2015 Impact Factor: 4.411)
- Ad-hoc referee for Genetic Epidemiology (2015 Impact Factor: 2.553)

### **School:**

- Student Affairs Committee, COAS, Fall 2017 – current

### **Departmental:**

- Academic Affairs Committee, Spring 2018
- Colloquium Committee, IPFW Mathematical Sciences, Fall 2017 – current
- Technology Committee, IPFW Mathematical Sciences, Fall 2017 – current
- Statistics Curriculum Committee, IPFW Mathematical Sciences, Fall 2016 – current
- Awards and Scholarship Committee, IPFW Mathematical Sciences, Fall 2016 – current
- Placement Committee, IPFW Mathematical Sciences, Fall 2016 – Spring 2017
- Mathematical Sciences new student orientation presenter, August 2017
- Logistics help for Midwestern Workshop on Asymptotic Analysis, October 2016
- Graduate Committee, CU Denver Mathematical Sciences, Student Member, Fall 2015
- Teaching Mentor for “Promoting Success in Early College Mathematics Through Graduate Teacher Training” project, 2015/2016 academic year

- Co-organizer, First Year Graduate Students Seminar, Fall 2015, Fall 2014
- Observed and provided feedback for new TA lecturers, Fall 2015, Fall 2014, Fall 2013
- Helped with departmental recruitment effort for new graduate students, Spring 2015, Spring 2014
- Participated in Undergraduate Study Hall, final exams review sessions, 2010-2013
- Teaching panel member for the TAs teaching seminar, Fall 2013
- Optional Recitation Sessions: Linear Algebra, Fall 2008, Fall 2007 and for Differential Equations, Fall 2007
- Orientation Week Workshop for Freshmen, Fall 2008, Fall 2007

### **Community and Outreach:**

- Faculty co-advisor IPFW Actuarial Club, 2017 – current
- Statistical consulting work, February 2018, July and March 2017
- Grader for MATHCOUNTS Fort Wayne Competition, February 2018, February 2017
- Table Activity Leader, Julia Robinson Math Festival Denver September 2015 (> 320 middle school students), September 2015

### **Professional Development**

---

- Salford Webinar Series: Learn How to Make Machine Learning Work, CART Decision Trees, Gradient Boosting, Random Forest, MARS non-linear regression, advanced modeling, October 3,10,17,31, 2017
- Sequencing Strategies for Population and Cancer Epidemiology Studies, National Cancer Institute Webinar Series: Analyzing Large Scale Sequenced Based Epidemiological Studies, September 27, 2017
- Society of Actuaries Candidate Connect Webcast: ASA Changes Update, September 13, 2017
- Building a Data Science Pipeline, Wolfram U webinar, July 25, 2017
- Society of Actuaries Actuarial Teaching Conference, Pittsburgh, June 26 - 27, 2017
- Dr. Leitze, Ball State University, A Journey into Online Teaching: Tips and Tidbits, May 8, 2017
- Advising IPFW Students: What You Need to Know and Do (New Faculty Institute event), January 2017
- IPFW 7th Annual Symposium on Teaching and Learning Cultivating Learning: Evidence-Based Strategies to Enhance College Teaching, January 5, 2017
- Teaching IPFW Students with High Impact Practices (New Faculty Institute event), November 2016
- Assessing Your Teaching Success at IPFW (New Faculty Institute event), October 2016
- Graduate Faculty Mentoring Workshop, October 2016
- Society of Actuaries Education Update: Curriculum Changes Webcast, August 2016
- Jumpstart for New Faculty, IPFW optional workshop, August 2016
- Critical Issues in Undergraduate Mathematics Education Seminar, CU Denver, Fall 2015, Spring 2016
- Front Range Mathematics Education Seminar, February 2015, March 2015
- CITI Collaborative Institutional Training Initiative Human Research Curriculum, April 2014
- Advanced Gene Mapping Course, Rockefeller University, New York, January 2014
- Summer Institute in Statistical Genetics, University of Washington, Seattle, July 2013
- Summer Institute in Statistical Genetics, University of Washington, Seattle, July 2012
- CU Online Teaching Spring Symposium, May 2012

### **Languages Spoken**

---

English (fluent), Russian (conversational), Bulgarian (native speaker)

### **Programming and Computational Background**

---

Currently Using: R; C; AWK and bash scripting; PBS/SLURM; python; Mathematica; Impute2; Shapeit; plink; RFMix; gtool; qctool; admixture; King; GCTA; LD Score

Experience with: SAS; LaTeX; MySQL; C++; MATLAB; CUDA; MPI; HTML; network protocols; various graphic design packages; Bioconductor; LAMP-LD, GemTools, JAGS; BC|SNP