

# A. Grant Schissler

*Developing and disseminating statistical informatic methods to facilitate precision medicine*

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## EDUCATION

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**PhD Statistics** 2012-2017

*University of Arizona, Tucson, AZ*

Statistical Informatics track, Minor in Genetics

[Statistics Graduate Interdisciplinary Program \(GIDP\)](#)

Advisors: Walter W. Piegorsch (Statistics) & Yves A. Lussier (Biomedical Informatics)

Thesis:

*Contributions to gene set analysis of correlated, paired-sample transcriptome data to enable precision medicine*

**MS Applied Statistics** 2009-2011

*Kennesaw State University, Kennesaw, GA*

Honors Graduate (4.0 GPA)

**BS Applied Mathematics** 2002-2005

*Georgia Institute of Technology, Atlanta, GA*

Dean's List, Social/Personality Psychology Certificate

## RESEARCH AREAS

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### Statistical

*Bayesian modeling, single-subject inference, multivariate statistics, computing, machine learning, clustering, high-dimensional data, small-sample, paired-sample statistics, big data, data visualization, high-throughput data*

### Interdisciplinary

*Biomedical informatics, bioinformatics, precision medicine, clinical translation, N-of-1, gene expression, gene set analysis, single-cell RNA-seq, cancer, systems biology, case-based reasoning, big clinical data*

## APPOINTMENTS

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**Assistant Professor of Statistics** 2017-current

*The University of Nevada, Reno, Department of Mathematics & Statistics, University of Arizona*

Applied statistician with interest in developing Bayesian models to facilitate knowledge discovery and scientific inquiry. Responsibilities include teaching, mentoring, undertaking original research, grant writing, and software engineering.

**Research Assistant** 2014-2017

*Lussier Group, Center for Biomedical Informatics & Biostatistics, University of Arizona*

Developed statistical informatics methodology for precision medicine. Engaged in interdisciplinary research: working with an expert team of statisticians, physicians, engineers, biologists, geneticists, and computer scientists. Responsibilities include original research, statistical support, grant writing, and software engineering. Here is a [link](#) describing our work to Tucson ABC-affiliate KGUN9 (@1:30 minutes).

**Instructor/Teaching Assistant** 2012-2014

*University of Arizona*

Developed curriculum and served as an instructor of Preparation for University-Level Mathematics. Also taught Statistical Foundations in the Information Age including R programming.

Designed and utilized best-practice pedagogy to teach nearly every secondary mathematics course offered in Georgia. Specialized in AP Statistics. Implemented effective classroom management and motivational systems. Designed and delivered professional development for teachers.

## PEER-REVIEWED JOURNAL PUBLICATIONS [Stats]

1. [A. Grant Schissler](#), Dillon Aberasturi, Colleen Kenost and Yves A. Lussier, “[A single-subject method to detect pathways enriched with alternatively spliced genes](#)”, *Frontiers in Genetics: Current Trends in Translational Bioinformatics* **10**, 414 (2019).
2. Xiang Li<sup>†</sup>, [A. Grant Schissler](#), Rui Wu, Lee Barford, and Frederick C. Harris, Jr., “A graphical processing unit accelerated NORMal-To-Anything algorithm for high dimensional multivariate simulation”, *Proceedings of ITNG 2019 to appear*, (2019).
3. Samir R. Zaim\*, Qike Li\*, [A. Grant Schissler\\*](#), and Yves A. Lussier, “[Emergence of pathway-level composite biomarkers from converging gene set signals of heterogeneous transcriptomic responses](#)”, *Biocomputing* **2018**, 484-495 (2018).
4. Jingyu Liu, Walter W. Piegorsch, [A. Grant Schissler](#) and Susan L. Cutter, “[Autologistic modeling in quantitative risk analysis, with applications to urban vulnerability assessment of terrorism outcomes](#)”, *Journal of the Royal Statistical Society: Series A* **181**, 3 (2018).
5. [A. Grant Schissler](#), Walter W. Piegorsch and Yves A. Lussier, “[Testing for differentially expressed genetic pathways with single-subject N-of-1 data in the presence of inter-gene correlation](#)”, *Statistical Methods in Medical Research* **27**, 12 (2018).
6. Francesca Vitali, Qike Li, [A. Grant Schissler](#), Joanne Berghout, Colleen Kenost, Yves A. Lussier, “[Developing a ‘personalome’ for precision medicine: emerging methods that compute clinically interpretable effect sizes from single-subject omics](#)”, *Briefings in Bioinformatics* **bbx149**, (2017).
7. V Gardeux\*, J Berghout\*, I Achour\*, [AG Schissler\\*](#), Q Li, C Kenost, J Li, Y Shang, A Bosco, D Saner, MJ Halonen, DJ Jackson, H Li, FD Martinez, and YA Lussier, “[A genome-by-environment interaction classifier for precision medicine: personal transcriptome response to rhinovirus identifies children prone to asthma exacerbations](#)”, *Journal of the American Medical Informatics Association: JAMIA* **ocx069**, (2017).
8. Qike Li\*, [A. Grant Schissler\\*](#), Vincent Gardeux, Ikbel Achour, Colleen Kenost, Joanne Berghout, Haiquan Li, Hao Helen Zhang and Yves A. Lussier, “[N-of-1-pathways MixEnrich: advancing precision medicine via single-subject analysis in discovering dynamic changes of transcriptomes](#)”, *BMC Medical Genomics* **10(Suppl 1)**, 27 (2017).
9. Qike Li\*, [A. Grant Schissler\\*](#), Vincent Gardeux, Joanne Berghout, Ikbel Achour, Colleen Kenost, Haiquan Li, Hao Helen Zhang and Yves A. Lussier, “[kMEn: analyzing noisy and bidirectional transcriptional pathway responses in single subjects](#)”, *Journal of Biomedical Informatics* **66**, (2017).
10. [A. Grant Schissler](#), Qike Li, James Chen, Colleen Kenost, Ikbel Achour, Dean Billheimer, Haiquan Li, Walter W. Piegorsch, and Yves A. Lussier, “[Analysis of aggregated cell-cell statistical distances within pathways unveils therapeutic-resistance mechanisms in circulating tumor cells](#)”, *Bioinformatics* **32**, 12 (2016).
11. [A. Grant Schissler](#), Vincent Gardeux, Qike Li, Ikbel Achour, Haiquan Li, Walter W. Piegorsch and Yves A. Lussier, “[Dynamic changes of RNA-sequencing expression for precision medicine: N-of-1-pathways Mahalanobis distance within pathways of single subjects predicts breast cancer survival](#)”, *Bioinformatics* **31**, 12 (2015).

<sup>†</sup> = student under my supervision, \* = joint first authorship

## ORIGINAL ARTICLES UNDER REVIEW OR SUBMITTED

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1. Jingyu Liu, Walter W. Piegorsch, A. Grant Schissler, Rachel E. Reeves, and Susan L. Cutter, “Exploring correlation adjustments for benchmark risk analysis with non-spatial autocorrelation, with application to natural hazard risk assessment data”, **Statistical Analysis and Data Mining**, (Nov 2018).

## BOOK CHAPTERS

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1. A. Grant Schissler, Hung Nguyen, Tin Nguyen, Juli Petereit, Vincent Gardeux, “Statistical Software”, **Wiley StatsRef-Statistics Reference Online**, (2018).

## GRADUATE STUDENT SUPERVISION

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Direct(ed) MS thesis work for the following students:

- Alex Knudson – MS in Statistics & Data Science “Bayesian Multi-level Modeling of Psychometric Data” *expected May 2020*

Direct(ed) undergraduate honors thesis for the following students:

- Kyle Murray – BS in Mathematics, emphasis in Statistics – “Modelling Healthcare Usage in Nevada from 2013 to 2018 by Using Emergency Department Check-ins: A Bayesian Approach” *May 2019*

Serve(d) on the MS thesis or PhD dissertation committees:

- Janyne Little – MS in Natural Resources & Environmental Science “Post-Wildfire Livestock Grazing Management on Public Rangelands in Northeast California” *expected Summer 2019*
- Conner Dailey – MS in Physics “Probing Exotic Fields with the Global Positioning System” *expected Summer 2019*
- Cheyenne Acevedo – MS in Natural Resources & Environmental Science “Hierarchical Modeling of Spatial Data to Estimate Abundance of Sage-Grouse in Nevada” *expected Summer 2020*
- Trevor Faske – PhD in Ecology, Evolution, and Conservation Biology “Who framed Rubber Rabbitbrush? genetics, environment, or both” *expected 2022*
- Lin Li – PhD in Civil and Environmental Engineering “Biomass Density-Function Relationships in Activated Sludge Process” *expected 2022*

## COMPUTING SKILLS

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Software creator/maintainer <http://www.lussiergroup.org>

NOF1 R Package

Programming/Scripting Languages

R (*expert*), SHELL(BASH), PBS/LSF HIGH-PERFORMANCE COMPUTING, PYTHON

Statistical Packages

SPSS, SAS 9 (*Certified Advanced Programmer*), MINITAB, R

Operating Systems

MAC OS, WINDOWS, LINUX

Reproducible Research/Publishing

L<sup>A</sup>T<sub>E</sub>X, R MARKDOWN, EMACS ORG-MODE, MS WORD, ADOBE ILLUSTRATOR, GIT

## **SYNERGISTIC ACTIVITIES/ASSOCIATIONS**

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- Peer review for the Challenges in Pattern Recognition in Big Data *Pacific Symposium of Biocomputing 2018* (Sep 2018)
- Peer review for *Communication in Statistics* (Jul 2018)
- [UNR Neuroscience Institute affiliated faculty](#) (since Aug 2018)
- University of Arizona [Center for Biomedical Informatics & Biostatistics](#) affiliated faculty (since Jul 2017)
- Undergraduate applied math research poster judge at SACNAS 2017 (Oct 2017)
- Peer review for the *BMC Bioinformatics* (Aug 2017)
- Translational Bioinformatics in Precision Medicine (TBC) 2017 Scientific Review Board (July 2017)
- University of Arizona Graduate & Professional Student Council Travel Grant Judge (September 2016)
- Contributed to the University of Arizona Health Sciences' participation in the [National Precision Medicine Initiative®](#) (Feb 2016)
- Peer review for the *Journal of Biomedical Informatics* (2015)
- Secondary Education Statistics Diversity Outreach: Collaboratively developed and delivered motivational statistics presentation for Saguaro High School statistics classes (29 Apr 2015), Catalina HS (29 Jan 2016), Sunnyside HS (12 Feb 2016), Bisbee HS (5 Apr 2016), San Miguel HS (23 Mar 2017)
- Member: American Statistical Association (ASA), Royal Statistical Society (RSS), International Society for Computational Biology (ISCB)
- Educator: Clear and Renewable Georgia Educator Certificate Mathematics (6-12)

## **PRESENTATIONS AT PROFESSORIAL MEETINGS, CONFERENCES, EVENTS**

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1. ITNG 2019\*, Las Vegas, NV, Apr 2019 (A graphical processing unit accelerated NORMal-To-Anything algorithm for high dimensional multivariate simulation)
2. JSM-2018, Vancouver, Canada, August 2018 (Clustered- $T$ : Correlated paired-sample gene set test)
3. Health Campus Conference, Reno, NV, Nov 2017 (GxE classifier for precision medicine)
4. Health Campus Conference, Reno, NV, Nov 2017 (GxE classifier for precision medicine)
5. TBC-2017\*, Los Angeles CA, Sep 2017 (Computational analyses of single-subject 'omics' to develop a 'personalome': How far are we from clinically-interpretable results?)
6. JSM-2016, Chicago IL, August 2016 (Testing for differentially expressed pathways from within-subject matched pairs of RNA-seq data sets)
7. ISMB-2016, Orlando FL, July 2016 (Statistical distances in circulating tumor cells)
8. First workshop on Interdisciplinary Statistics, CIMAT Guanajuato Mexico, June 2016 (Statistical informatics for precision medicine)
9. ISMB/ECCB-2015, Dublin, July 2015 (N-of-1-*pathways* MD)
10. 2016 Mathematics Educator Appreciation Day, Tucson, 23 Jan 2016 (Incorporating quantitatively-talented and underrepresented high school students in Arizona into the biostatistics community)

\* = Joint work was highlighted, but another author presented.

## **SEMINARS AND COLLOQUIA**

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1. UNR Statistics & Data Science Graduate Seminar, Reno, NV, Apr 2019 (A single-subject method to detect pathways enriched with alternatively spliced genes)

2. Bioinformatics Mixer, Reno, NV, Apr 2019 (A single-subject method to detect pathways enriched with alternatively spliced genes)
3. Wrocław University of Science and Technology, Wrocław, Poland, Mar 2019 (A single-subject method to detect pathways enriched with alternatively spliced genes)
4. University of Wrocław, Wrocław, Poland, Mar 2019 (A single-subject method to detect pathways enriched with alternatively spliced genes)
5. Wrocław University of Science and Technology, Wrocław, Poland, Mar 2019 (A single-subject method to detect pathways enriched with alternatively spliced genes)
6. Bioinformatics Mixer, Reno, NV, Apr 2019 (A single-subject method to detect pathways enriched with alternatively spliced genes)
7. UNR Neurolecture Journal club, Reno, NV, Nov 2018 (Reasoning with Uncertainty the Bayesian way with examples in Cognitive Modeling in R and Stan)
8. UNR Neurolecture Series, Reno, NV, Feb 2018 (Reasoning with Uncertainty the Bayesian way with examples in Cognitive Modeling in R and Stan)
9. Bioinformatics Mixer, Reno, NV, Feb 2018 (Gene set analysis of correlated, paired-sample transcriptome data to enable precision medicine)
10. University of Arizona, Quantitative Biology Colloquium, *Gene set analysis of correlated, paired-sample transcriptomes to enable precision medicine*, 4 Apr 2017
11. University of Arizona, GPSC Grad Slam, *Information Age statistical analysis of gene expression data to enable precision medicine*, 24 Mar 2017
12. University of Arizona, Stats GIDP blitz talks, *Interdisciplinary statistics training*, 6 Mar 2017
13. University of Nevada, Reno, Colloquium, *Contributions to gene set analysis of correlated, paired-sample transcriptomes to enable precision medicine*, 17 Feb 2017
14. University of Arizona Biostatistics Seminar, *Statistical Development of N-of-1-pathways MD*, 17 Feb 2016
15. University of Arizona Statistics Student Meeting, *Reproducible Research through GNU Emacs Org-mode*, 18 Feb 2014

## POSTER SESSIONS AND SHOWCASES

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1. RSS 2018 - Cardiff, Wales, *Testing for differentially expressed genetic pathways with single-subject N-of-1 data in the presence of inter-gene correlation*, Sep 2018
2. JSM 2016 - Chicago, IL, *Increasing awareness of careers and an education in statistics among quantitatively-talented underrepresented high school students*, Aug 2016
3. University of Arizona Student Showcase, *N-of-1-pathways for precision medicine*, 24 Feb 2016
4. GIDP Student Research Showcase, *N-of-1-pathways for precision medicine*, 10 Dec 2015

## AWARDS & GRANTS

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- 2019 [Westfall Mentor](#), The University of Nevada, Reno, Kyle Murray.
- 2016 [GPSC Travel Grant](#), Merit-based travel grant for JSM 2016 in Chicago, IL
- 2016 [ISMB Travel Fellowship](#), Merit-based travel fellowship for ISMB 2016 in Orlando, FL
- Summer 2016 [HE Carter Travel Award](#), Graduate Interdisciplinary Programs, University of Arizona
- Summer 2015 [HE Carter Travel Award](#), Graduate Interdisciplinary Programs, University of Arizona

- 2015 [ASA Biometrics Section Funding of Proposed Strategic Initiative](#): Incorporating quantitatively-talented and underrepresented high school students in Arizona into the biostatistics community. - Grant Co-Investigator

## Student Awards

- 2019 [Spring 2019 Herz Gold Medalist](#), The University of Nevada, Reno, Kyle Murray.
- 2019 [Department of Mathematics & Statistics Westfall Scholar](#), The University of Nevada, Reno, Kyle Murray.

## LICENSURES AND CERTIFICATIONS

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- 2019, Certificate in Effective Instruction, Association of College and University Educators

## TEACHING

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@ The University of Nevada, Reno:

- Spring 2019: **MATH 429/629: Introduction to Bayesian Statistics**  
Led an undergraduate/graduate hybrid course in an introduction to Bayesian statistics. Proposed and developed the course using activity learning activities. Statistical inference using Bayes' Theorem. Topics include Bayesian/frequentist comparison, posterior analysis for continuous and discrete random variables, prior specification, Bayesian regression, multivariate inference, and posterior sampling through Markov Chain Monte Carlo.
  - *“Dr. Schissler is as much a life coach as he is statistician and instructor. On top of excellently conveying the information of the weekly lessons, he also routinely showed the class tools to be better prepared and organized in many other aspects of life. I look forward to his class next semester.”*
  - *“Dr. Schissler is by far the best teacher I’ve had in any form of academia. He is very methodical as he maps out a day plan for each class and follows it well. He never tries to hide information from any student and is constantly encouraging his students to engage in the material and actively learn. He is very generous and always gives the benefit of the doubt to his students when errors are made on tests or homework. He is very approachable and friendly to his students. He doesn’t just lecture, he teaches. It has been a tremendous class thanks to Dr. Schissler, and I hope to have more classes taught by him in the future.”*
- Fall 2018: **STAT 445-645: Introduction to Statistical Computing**  
Led an undergraduate/graduate hybrid course in statistical computing. Developed course using both online and in-class activities. Topics include basic R programming, data analysis workflow, optimization, parallel computing, maximum likelihood estimation, Markov Chain Monte Carlo (MCMC), Monte Carlo studies, bootstrap, and advanced data visualization.
  - *“He was an amazing professor. He really cared about his students and wanted their feedback to improve the course and his teaching. He was extremely fair with grading and was very clear with what he expected us to be able to do. He was always there to help any student that needed it. I loved how he showed us stats on MiniTab and R...”*
  - *“One of the best professors I’ve ever had. He has a better teaching method than most, but understands that it needs some adjustment. He completely overhauled his teaching method to ensure that the class learned his material. Truly showed love for teaching and interest in making sure we walked away with the knowledge we needed[.]”*
- Summer 2018: **MATH 352: Probability & Statistics**  
Taught an accelerated-schedule traditional introduction to prob/stat for 47 upper-level STEM-major students. Some student testimonials are included below:



- *“He was an amazing professor. He really cared about his students and wanted their feedback to improve the course and his teaching. He was extremely fair with grading and was very clear with what he expected us to be able to do. He was always there to help any student that needed it. I loved how he showed us stats on MiniTab and R...”*
- *“One of the best professors I’ve ever had. He has a better teaching method than most, but understands that it needs some adjustment. He completely overhauled his teaching method to ensure that the class learned his material. Truly showed love for teaching and interest in making sure we walked away with the knowledge we needed[.]”*
- **Spring 2018: STAT 757: Applied Regression Analysis**  
 Guided a class of 26 graduate students in applied regression analysis in R and R Markdown. Topics included simple and multiple linear regression, diagnostics/remediation, model selection, time series, logistic regression, and mixed effects modeling. Supervised 15 research projects during the course. Some student testimonials are included below:
  - *“This was one of the best courses I had outside my discipline. I liked the instructor’s teaching style, knowledge, and candidness. He made a great impression on me and helped me improve several aspects of my learning style. He has great passion for what he does and it shows.”*
  - *“Grant is very enthusiastic and helpful. The class was challenging, but I liked his approach to teaching it. Constantly pushing, and focused on the learning rather than the grade. He was readily available to answer questions and you can tell he really enjoys his job/work. If he doesn’t, he fakes it really well.”*
- **Fall 2017: MATH 330: Linear Algebra**  
 Guided a class of 70+ upper-class undergraduate students to obtain/exceed linear algebra learning objectives. Developed a ‘blended’ approach to instruction, featuring flipped classroom elements along with collaborative in-class work sessions. Some student testimonials are included below:
  - *“Doctor Schissler cares very much about student success. He is empathetic, understanding, and passionate about the subject material! The flipped classroom approach takes some getting used to, but it does make the “ah-ha” moments when something clicks all the more satisfying.”*
  - *“One of the best professors I’ve ever had. He has a better teaching method than most, but understands that it needs some adjustment. He completely overhauled his teaching method to ensure that the class learned his material. Truly showed love for teaching and interest in making sure we walked away with the knowledge we needed[.]”*

@ U. of Arizona:

- **Fall 2012/2013: SAS100AX: Preparation for University Level Mathematics**  
*Instructor:* Guided first year students to become independent learners through explicit instruction of metacognition, mathematics learning strategies, performance traits, and rapid skill acquisition. Designed “flipped” classroom curriculum to maximize student learning and engagement. Formerly behind students were retained at much higher rates than on-level students.
- **Fall 2012: ISTA116: Statistical Foundations in the Information Age**  
*Teaching Assistant:* Led a weekly statistics laboratory. We focused on a broad range of applications with computing solutions via R.

@ Tri-Cities High School, Math Dept.:

- **2008-2012: AP Statistics**  
*Instructor:* Received best-practice training from Paul Myers and Josh Tabor among others. Designed and implemented “flipped” classroom curriculum. Grew the statistics program by gaining stakeholder interest, resulting in more than a 50% increase in student enrollment. Increased AP exam success and student awareness of statistical careers. Spearheaded data-driven decision making for student/school initiatives.
- **2006-2012: Other Secondary Math Courses**  
*GPS Advanced Algebra, Discrete Math, Trigonometry, Geometry, Algebra I-III:*

Taught every secondary course available except AP Calculus. Specialized in teaching 11<sup>th</sup> grade students to prepare them for the Georgia High School Graduation Test (GHS GT). The GHS GT is a major determinant of student and school-wide achievement. Designed and led after-school tutorial programs for GHS GT.