

## 1. Master's Thesis Independent Studies, San Francisco State University

**Aug 2019 - Dec 2021**

*The following independent study activities were completed under the supervision of my advisor, Dr. Tao He, as part of my MA mathematics thesis research at San Francisco State University.*

### Authoring, Publicizing and Maintaining R Packages

Fall Semester 2021

**References:**

1. Wickham H. (2015) *R Packages: Organize, Test, Document, and Share Your Code*. O'Reilly Media, Inc., Boston, Massachusetts, USA.
2. Roger D. Peng, Sean Kross, and Brooke Anderson. (2020) *Mastering Software Development in R*. Victoria, British Columbia, Canada: Leanpub. Retrieved from: <https://bookdown.org/rdpeng/RProgDA/>

**Topics:** Version control using Git, error handling, unit testing, style, object documentation and vignettes, licensing, publication via GitHub and via CRAN,

### Variation of P-values in Permutation Tests

Fall Semester 2021

**References:**

1. Knijnenburg, T. A., Wessels, L. F. A., Reinders, M. J. T., & Shmulevich, I. (2009). Fewer permutations, more accurate P-values. In *Bioinformatics* (Vol. 25, Issue 12, pp. i161–i168). Oxford University Press (OUP). <https://doi.org/10.1093/bioinformatics/btp211>
2. Marozzi, M. (2007). Some remarks about the number of permutations one should consider to perform a permutation test. *Statistica*; Vol 64, No 1 (2004); 193-201. <https://doi.org/10.6092/ISSN.1973-2201/32>

**Topics:** Nature and sources of variation in the P-value obtained by sampling from the permutation null distribution; empirical evaluation of the effect of the number of permutations used; justification for the pseudocount adjustment; alternative methods for approximating the permutation null distribution for particular types of test statistics

### Computation and Programming in Python

Summer 2021

**Textbooks:** Guttag, John V. *Introduction to Computation and Programming Using Python : With Application to Computational Modeling and Understanding Data*. Cambridge, Massachusetts: The MIT Press, 2021. Print.

**Topics:** Functions, scoping and abstraction; structured types and mutability; list and dictionary comprehension; recursion and global variables; modules and files;

exceptions and assertions; classes and methods; Pandas library and DataFrame class/methods

## Programming in C++ and Strategies for Writing Faster Programs in R

Spring Semester 2021

### References:

1. Wickham, Hadley. *Advanced R*. Boca Raton: Taylor & Francis, CRC Press, 2019. Print.
2. Prabhakaran, Selva. "Strategies to Speed Up R Code." *datascienceplus*, Jan 2016 (updated May 2018), <https://datascienceplus.com/strategies-to-speedup-r-code>.
3. Eddelbuettel, Dirk and Balamuta, Joseph. "Extending R with C++: A Brief Introduction to Rcpp." Vignette for *Rcpp* (R library). July 3, 2021. <https://cran.rstudio.com/web/packages/Rcpp/vignettes/Rcpp-introduction.pdf>
4. Eddelbuettel, Dirk and Francois, Romain. "Rcpp: Seamless R and C++ Integration." March 2017. Publicly available at <http://dirk.eddelbuettel.com/code/rcpp/Rcpp-introduction.pdf>.
5. Eddelbuettel, Dirk and Francois, Romain. "Writing a package that uses Rcpp." March 2017. Publicly available at <https://dirk.eddelbuettel.com/code/rcpp/Rcpp-package.pdf>.
6. Weston, Steve. "Using the *foreach* package." Vignette for *foreach* (R library). <https://cran.r-project.org/web/packages/foreach/vignettes/foreach.html>
7. Calaway, Rich. "Using the *iterators* package." Vignette for *iterators* (R library). October 2020. <https://cran.r-project.org/web/packages/iterators/vignettes/iterators.pdf>.

**Topics:** Programming in C++; toolchain compilers; writing R packages containing C++ source code using *Rcpp*; compiling attributes, header files, interfacing custom C and C++ code; functions, classes and methods for *RcppSugar* and *RcppArmadillo* C++ libraries; parallel processing in R using the *foreach*, *doparallel* and *iterators* packages

## Developing R Packages and Using R's Foreign Language Interface

Spring Semester 2021

**References:** "Writing R Extensions." R Core Team, 2021.

<https://cran.r-project.org/doc/manuals/r-release/R-exts.html>.

**Topics:** Internal structure of R packages, metadata, namespaces and dynamic symbols/libraries, checking and building packages, system and foreign language interfaces, registering native routines

## Reading on Reproducing Kernel Hilbert Spaces

Fall Semester 2020

### References:

1. [\*An Introduction to the Theory of Reproducing Kernel Hilbert Spaces. \(Course Lecture Notes from the University of Houston by Vern I. Paulsen, 2009\)\*](#)
2. Cucker F and Smale S. *On the Mathematical Foundations of Learning*. Bulletin of the American Mathematical Society, Vol 39-1, 1-49 (2002).

**Topics:** Kernel functions, evaluation functionals, RKHS definition, reproducing kernels and the reproducing property, connection to Riesz representation, distinction between  $L^2$ -spaces and RKHS, convergence in RKHS, Parseval identities, interpolation, integral operator defined by a kernel, spectral theorem, Mercer's theorem, representer theorem

## Reading on Asymptotic Theory in Probability and Statistics

Fall Semester 2020

### Textbooks:

1. Lehmann, E. L. *Elements of Large-Sample Theory*. New York: Springer, 1999. Print.
2. DasGupta, Anirban. *Asymptotic Theory of Statistics and Probability*. New York: Springer, 2008. Print.

**Topics:** Convergence in probability/distribution, central limit theorems, Edgeworth expansion, delta method, VSTs, asymptotic power, U-statistics

## Survey of Research in Genetic Association Testing Methodology

Summer Semester 2020

### References:

1. Deng Y, He T, Fang R, Li S, Cao H and Cui Y (2020) Genome-Wide Gene-Based Multi-Trait Analysis. *Front. Genet.* 11:437. doi: 10.3389/fgene.2020.00437
2. Larson N.B., Jun C and Schaid, D.J. A Review of Kernel Methods for Genetic Association Studies. *Genet Epidemiol.* 2019 March ; 43(2): 122–136. doi:10.1002/gepi.22180
3. Maity A, Sullivan P.F., Tzeng J-Y (2012) Multivariate Phenotype Association Analysis by Marker-Set Kernel Machine Regression. *Genet Epidemiol.* 2012 November ; 36(7): 686–695. doi: 10.1002/gepi.21663
4. Broadaway KA, Cutler DJ, Duncan R, Moore JL, Ware EB, Jhun MA, Bielak LF, Zhao W, Smith JA, Peyser PA and others. 2016 A Statistical Approach for Testing Cross-Phenotype Effects of Rare Variants. *American journal of human genetics* 98(3):525–40. [PubMed: 26942286]
5. Zhan, X., Zhao, N., Plantinga, A., Thornton, T. A., Conneely, K. N., Epstein, M. P., & Wu, M. C. (2017). Powerful Genetic Association Analysis for Common or Rare Variants with High-Dimensional Structured Traits. In *Genetics* (Vol. 206, Issue 4, pp. 1779–1790). Oxford University Press (OUP). <https://doi.org/10.1534/genetics.116.199646>
6. Wu, M.C., Kraft P, Epstein M.P., Taylor D.M., Chanock S.J., Hunter D.J. and Lin X (2010). Powerful SNP-Set Analysis for Case-Control Genome-wide Association Studies. *The American Journal of Human Genetics.* 86, 929-942.
7. Liu D, Ghosh D and Lin X (2008). Estimation and testing for the effect of a genetic pathway on a disease outcome using logistic kernel machine regression via logistic mixed models. *BMC Bioinformatics.* 9:292. doi: 10.1186/1471-2105-9-292
8. Liu D, Lin X and Ghosh D (2007) Semiparametric Regression of Multidimensional Genetic Pathway Data: Least-Squares Kernel Machines and

Linear Mixed Models. *Biometrics*. 63, 1079-1088. doi: 10.1111/j.1541-0420.2007.00799.x

9. Kwee L.C., Liu D, Lin X, Ghosh D and Epstein M.P. (2008) A Powerful and Flexible Multilocus Association Test for Quantitative Traits. *The American Journal of Human Genetics*. 82, 386-397. doi: 10.1016/j.ajhg.2007.10.010
10. Schaid, Daniel J. Genomic Similarity and Kernel Methods I: Advancements by Building on Mathematical and Statistical Foundations. *Hum Hered*. 2010 Jul; 70(2): 109–131. doi: 10.1159/000312641
11. Schaid, Daniel J. Genomic Similarity and Kernel Methods II: Methods for Genomic Information. *Hum Hered*. 2010 Jul; 70(2): 132–140. doi: 10.1159/000312643
12. Wang Y, Liu A, Mills JL, Boehnke M, Wilson AF, Bailey-Wilson JE, Xiong M, Wu CO and Fan R. Pleiotropy Analysis of Quantitative Traits at Gene Level by Multivariate Functional Linear Models. *Genet Epidemiol*. 2015 May ; 39(4): 259–275. doi:10.1002/gepi.21895.
13. He Q, Avery C and Lin D-Y (2013) A General Framework for Association Tests With Multivariate Traits in Large-Scale Genomics Studies. *Genet Epidemiol*. 2013 December ; 37(8): 759–767. doi:10.1002/gepi.21759

**Topics:** Kernel-based testing methods in genetic association studies; multi-trait genetic association tests

## MATH 899 Independent Study on Measure-theoretic Probability

Spring Semester 2020

*Reading independent study on measure-theoretic probability.*

**Grade:** A

**Supervisor:** Tao He

**Textbooks:** Çinlar, E. *Probability and Stochastics*. New York: Springer, 2011. Print.

**Topics:** Measurable spaces and functions, image measures, indefinite integrals and density functions, absolutely continuous measures and Radon-Nikodym derivative, transition kernels and product spaces, probability spaces and random variables, joint and marginal distributions, independencies, expectations,  $L^p$ -spaces and uniform integrability, almost-sure convergence, convergence in probability, convergence in  $L^p$ , weak convergence, laws of large numbers, convergence of series, central limits, conditional expectations, conditional probabilities and distributions, conditional independence

## MATH 899 Independent Study

Fall Semester 2019

*Reading of research preprints/articles and textbook material relevant to thesis research.*

**Grade:** A

**Supervisor:** Tao He

### Articles Read:

1. He, Zhong, Cui, Mandrekar. "Tests for Nonparametric Functions of High-Dimensional or Functional Covariates in RKHS with Kernel Selection and Regularization." *Statistica Sinica* (accepted).
2. He T, Li S, Zhong P-S and Cui Y (2019) An optimal kernel-based U-statistic method for quantitative gene-set association analysis. *Genet Epidemiol.* 2018;1-13. doi: 10.1002/gepi.22170
3. Maity A, Sullivan P.F., Tzeng J-Y (2012) Multivariate Phenotype Association Analysis by Marker-Set Kernel Machine Regression. *Genet Epidemiol.* 2012 November ; 36(7): 686-695. doi: 10.1002/gepi.21663

### Textbooks:

1. *Real Analysis: Measure Theory, Integration, & Hilbert Spaces* by Elias M. Stein & Rami Shakarchi (Chapter 4: Introduction to Hilbert Spaces)
2. *Asymptotic Methods in Analysis* by N.G. De Bruijn (Chapter 1: Introduction to Asymptotics)

**Topics:** Hilbert space definition, properties of Hilbert Space orthonormal bases, Parseval's identity, Bessel's inequality; O-notation, o-notation, asymptotic equivalence

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## 2. Courses Taken at San Francisco State University

**Aug 2017 - Dec 2019**

*The following courses were taken at San Francisco State University while enrolled in the mathematics MA program. All courses were taken at the graduate level unless otherwise indicated.*

### MATH 710 Analysis I

Fall Semester 2019

**Grade:** A

**Instructor:** Chun-Kit Lai

**Textbooks:** *Real Analysis: Measure Theory, Integration, & Hilbert Spaces* by Elias M. Stein & Rami Shakarchi

**Topics:** Measure theory and Lebesgue integration theory: sigma-algebras, outer measures, measures, measurable functions, integration, convergence, differentiation, functions of bounded variation, abstract measure spaces, Carathéodory measurability

## MATH 741 Probability and Statistics II

Spring Semester 2019

*Paired graduate/undergraduate course in mathematical statistics.*

**Grade:** A

**Instructor:** Mohammad Kafai

**Textbooks:** *Mathematical Statistics and Its Applications* by Richard J. Larsen and Morris L. Marx

**Topics:** Maximum likelihood and method of moments estimation, properties of estimators (bias, efficiency, sufficiency, consistency), derivation of sampling distributions (chi-squared, F-distribution, Student's t), hypothesis testing, confidence intervals, type I and II errors, power curves, one- and two-sample parametric inference on population means/variances, types of data, goodness-of-fit, contingency tables

## MATH 448 Introduction to Statistical Learning and Data Mining

Spring Semester 2019

*Undergraduate*

**Grade:** A

**Semester Project:** *Inference on Pitch-type Decision in Baseball Using Random Forests*

**Instructor:** Tao He

**Textbooks:** *An Introduction to Statistical Learning* by Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani

**Topics:** Bias-variance decomposition. Supervised and unsupervised learning; regression, classification and clustering; resampling methods; variable selection; model validation and regularization; dimension reduction. Linear regression, logistic regression, linear/quadratic discriminant analysis, K-nearest neighbors, principal components regression and partial least squares, polynomial regression, basis functions and generalized additive models, regression splines and smoothing splines, support vector machines, decision trees, random forests, bagging, boosting; cross-validation, bootstrap, subset selection, shrinkage methods (ridge and lasso); statistical computing in R

## MATH 380 Introduction to Complex Analysis

Spring Semester 2019

*Undergraduate*

**Grade:** A

**Instructor:** Chun-Kit Lai

**Textbooks:** *Complex Variables and Applications*, James Ward Brown and Ruel V. Churchill

**Topics:** Functions of a complex variable, analytic functions, contour integrals, power series, Cauchy-Riemann Equations, Cauchy's Theorem, Cauchy-Integral Formula, Cauchy's Inequality, Taylor's Theorem, Liouville's Theorem, maximum modulus principle, Laurent series, singularities, Residue Theorem with applications to definite and improper integrals, conformal mappings

## MATH 430 Optimization

Fall Semester 2018

Undergraduate

**Grade:** A

**Instructor:** Matthias Beck

**Textbooks:** *Linear Optimization* by Dimitris Bertsimas and John N. Tsitsiklis

**Topics:** Piecewise linear convexity, polyhedra and convex sets, basic feasible solutions, degeneracy, existence and optimality of extreme points, simplex method and column geometry, duality theory, Farkas' lemma, sensitivity analysis, network flows, flows on graphs, shortest path, traveling salesman, minimum spanning trees and greedy algorithm, integer programming, cutting plane, Gomory algorithm, branch and bound

## MATH 442 Probability Models

Fall Semester 2018

Undergraduate

**Grade:** A

**Instructor:** Alexandra Piryatinska

**Textbooks:**

1. *Probability Models* by Sheldon Ross
2. *Essentials of Stochastic Processes* by Richard Durrett

**Topics:** Conditional variance; computing probabilities, expectations and variances by conditioning; compound random variables; stochastic processes; Markov chains, initial distributions, classification of states, commutativity, Chapman-Kolmogorov equations, long-run proportions and limiting probabilities, irreducibility, periodicity, ergodicity, exit time, Gambler's ruin, mean time spent in transient states, time-reversible Markov chains, continuous Markov processes; branching processes; compound and nonhomogeneous Poisson processes; renewal theory; queueing theory, waiting times and exponential distribution; memorylessness; Monte Carlo inverse transform, Monte Carlo integration, Markov Chain Monte Carlo methods, Hastings-Metropolis algorithm, Gibbs sampler

## MATH 770 Real Analysis II

Spring Semester 2018

Paired graduate/undergraduate course

**Grade:** A

**Instructor:** Sheldon Axler

**Textbooks:** *Introduction to Analysis* by William Wade

**Topics:** Infinite series of real numbers: convergence, Cauchy sequences and absolute convergence; infinite sequences and series of functions: uniform convergence of sequences and series, uniform Cauchy criterion, power series, analytic functions; Euclidean and metric spaces: topology of  $\mathbb{R}^n$ , convergence in  $\mathbb{R}^n$ , abstract metric spaces, Heine-Borel Theorem, interior, closure, boundary, continuous functions, connectedness, path-connectedness, compactness, Stone-Weierstrass Theorem.



## MATH 850 Algebra

Spring Semester 2018

**Grade:** A

**Instructor:** Emily Clader

**Textbooks:** No required textbook; references included *Abstract Algebra* by D.S. Dummit and R.S. Foote, and *An Invitation to Algebraic Geometry* by Karen Smith, et al.

**Topics:** Commutative Algebra and Algebraic Geometry, polynomial rings, ideals, quotients, pullback homomorphisms, modules,  $k$ -algebras, affine and projective varieties, morphisms, Nullstellensatz, tensor products and exterior products of modules.

## MATH 725 Advanced Linear Algebra

Fall Semester 2017

**Grade:** A

**Instructor:** Serkan Hosten

**Textbooks:** *Linear Algebra Done Right* by Sheldon Axler

**Topics:** Real and complex vector spaces, direct sums, linear maps, rank factorization, change of basis and similarity, product and quotient maps, dual spaces and dual maps, alternating multilinear functions and determinant functions, nilpotent operators and Jordan canonical form, invariant subspaces, eigenvalues and eigenvectors, triangularizability, diagonalizability, characteristic and minimal polynomial, Cayley-Hamilton theorem, primary decomposition theorem, real and complex inner product spaces, Gram-Schmidt algorithm, QR factorization, Riesz representation theorem, self-adjoint and normal operators, finite-dimensional spectral theorem, isometries and unitary operators, singular value decomposition

## MATH 440 Probability and Statistics I (Undergraduate)

Fall Semester 2017

**Grade:** A

**Instructor:** Alexandra Piryatinska

**Textbooks:** *Mathematical Statistics and Its Applications* by Richard J. Larsen and Morris L. Marx

**Topics:** Set theory and elementary probability; conditional probability and Bayes' Theorem; independence; combinatorics and combinatorial probability; discrete and continuous random variables; probability density and cumulative distribution; functions of random variables; expected value, median, variance, higher moments; joint and marginal density; transforming and combining random variables; independence of random variables; conditional density; order statistics; moment-generating functions; common distributions (Bernoulli, binomial, inverse binomial, geometric, hypergeometric, Poisson, normal, exponential, gamma)



## MATH 735 Modern Algebra II

Fall Semester 2017

**Grade:** A

**Instructor:** Emily Clader

**Textbooks:** *Contemporary Abstract Algebra*, 8<sup>th</sup> ed. by Joseph Gallian

**Topics:** Review of group theory, cosets, quotient groups, group actions, conjugacy classes. Rings, commutative rings, quotient rings, integral domains, irreducible polynomials, prime ideals, and unique factorization domains. Modules, vector spaces, free modules, and finitely generated modules over PIDs. Field extensions, splitting fields, minimal polynomials and finite fields.

## MATH 700 Graduate Teaching Workshop

Fall Semester 2017

**Grade:** A

**Instructors:** Kim Seashore and Judy Kysh

**Textbooks:** No textbook

**Topics:** Discussion and analysis of teaching techniques, peer classroom observations, guided group and self analysis of videotapes and group projects developing and studying common lesson materials.

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## 3. Courses Taken at Sonoma State University

**Aug 2016 - May 2017**

*The following courses were taken at the undergraduate level at Sonoma State University, through the School of Extended and International Education's open enrollment policy, in order to complete prerequisites prior to applying to the mathematics MA program at San Francisco State University.*

## MATH 340 Real Analysis I

Spring Semester Semester 2017

**Grade:** A

**Instructor:** Elaine Newton

**Textbooks:** *Introduction to Analysis* by Edward D. Gaughan

**Topics:** Real number axioms and properties, sequence convergence, Cauchy sequences, Bolzano-Weierstrass theorem, limits of functions, continuity, uniform continuity, Heine-Borel theorem, intermediate value theorem, differentiability, Rolle's theorem, mean value theorem, Riemann integrability

## MATH 306 Number Theory

Spring Semester Semester 2017

**Grade:** A

**Instructor:** Izabela Kanaana

**Textbooks:** *A Friendly Introduction To Number Theory* by Joseph H. Silverman

**Topics:** Pythagorean triples theorem, Euclidean algorithm, prime divisibility property, Fundamental theorem of arithmetic, linear congruences, Fermat's little theorem, Euler's formula, Euler's totient function, Chinese remainder theorem, existence of infinitely many primes, prime number theorem, Mersenne primes, Euclid's perfect number theorem, sigma (divisor) function, modular roots, primitive roots, quadratic residues, Euler's criterion, law of quadratic reciprocity

## MATH 320 Modern Algebra I

Fall Semester 2016

**Grade:** A

**Instructor:** Izabela Kanaana

**Textbooks:** *Contemporary Abstract Algebra*, 8<sup>th</sup> ed. by Joseph Gallian

**Topics:** Groups, cyclic groups, symmetric groups, isomorphisms, Cayley's Theorem, automorphisms, cosets and Lagrange's Theorem, normal subgroups and factor groups, homomorphisms, First Isomorphism Theorem, external direct products and Fundamental Theorem of Finite Abelian Groups, rings, integral domains, fields, ideals, principal ideals, prime and maximal ideals

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## 4. Courses Taken at Santa Rosa Junior College

**Jan 2016 - May 2016**

*The following courses were taken at the undergraduate level at Santa Rosa Junior College in order to complete prerequisites for applying to the mathematics MA program at San Francisco State University. Santa Rosa Junior College holds articulation agreements treating these as equivalent to their upper-division undergraduate counterparts at both the University of California and California State University.*

### MATH 6 Mathematical Proofs and Reasoning

Spring Semester Semester 2016

**Grade:** A

**Instructor:** Dean Gooch

**Textbooks:** *Mathematical Proofs: A Transition to Advanced Mathematics*, 3<sup>rd</sup> ed. by Gary Chartrand, Albert D. Polimeni, and Ping Zhang

**Topics:** Sets, logic, quantified statements, direct proof and contrapositive, existence and proof by contradiction, weak and strong mathematical induction, equivalence relations, modular congruence, functions, injectivity, surjectivity, bijectivity, function composition and inverse, permutations, cardinalities of sets

### MATH 5 Linear Algebra

Spring Semester Semester 2016

**Grade:** A

**Instructor:** Tom Falbo

**Textbooks:** *Elementary Linear Algebra with Supplemental Applications*, 11<sup>th</sup> ed. by Howard Anton and Chris Rorres

**Topics:** Gaussian elimination; diagonal, triangular and symmetric matrices; determinants; Cramer's rule; row space, column space and rank; Euclidean inner product and orthogonal projection; real vector spaces; subspaces, span, linear independence and bases; change of basis; eigenvalues, eigenvectors and eigenspaces; inner product spaces

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## 5. Courses Taken at the University of California, Santa Cruz

Sep 2008 - June 2010

*The following courses were taken at the undergraduate level at the University of California Santa Cruz toward completion of a Bachelor of Arts in Economics.*

### ECON 114, Advanced Quantitative Methods

Spring Quarter, 2009

**Grade:** A-

**Instructor:** Kuntal Kumar Das

**Textbooks:** *Introductory Econometrics: A Modern Approach*, 4<sup>th</sup> ed. by Jeffrey M. Wooldridge

**Topics:** Concepts from probability theory (skewness and kurtosis; joint, marginal and conditional distributions; conditional expectation and variance; independence; central limit theorem), concepts from mathematical statistics (chi-squared, Student's t and F distributions; estimator unbiasedness, efficiency and consistency; type I and type II errors), multiple linear regression, OLS estimators and their finite-sample and asymptotic properties, OLS standard errors, generalized linear models, heteroskedasticity tests (Breusch-Pagan, Goldfeld-Quandt, White) and corrections (robust SEs, weighted least squares, generalized least squares), instrumental variable regression, overidentification tests (Hansen J and Sargan), Durbin-Wu-Hausman test, two-stage and indirect least squares, methods for time series and panel data (pooled regression, differencing, least squares dummy variables, fixed and random effects estimation), MLE estimators for logistic regression and Probit regression, Tobit regression, discrete choice models, applications in the Stata statistical software package

### ECON 113, Introductory Econometrics

Winter Quarter, 2008

**Grade:** A+

**Instructor:** Alan Spearot

**Textbooks:** *Introductory Econometrics: A Modern Approach*, 4<sup>th</sup> ed. by Jeffrey M. Wooldridge

**Topics:** Properties of mean and variance, conditional probability, covariance and correlation, random variables, uniform, normal and standard normal distributions,

simple linear regression, OLS and method-of-moments estimators for simple linear regression, heteroskedasticity, multiple linear regression, variance of OLS coefficient estimates under homoskedasticity, confidence intervals, hypothesis tests, t-tests, P-values, prediction and inference in regression analysis, full-exclusionary and general restriction F-tests for significance of OLS coefficients, dummy variables, generalized additive models (squared and interaction terms), standardizing variables, adjusted R-squared, model selection, Breusch-Pagan test for heteroskedasticity, discrete dependent variables, Probit and Logit models, endogeneity and omitted variable bias, panel data and differencing, instrumental variables, applications in the Stata statistical software package

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## 6. Courses Taken at Santa Rosa Junior College

### Spring 2006 - Spring 2008

*The following courses were taken at the undergraduate level at Santa Rosa Junior College as part of transferable lower-division coursework used to apply to University of California Santa Cruz as a junior transfer student in the Economics BA program.*

#### MATH 2A, Calculus III

Spring Semester 2008

**Grade:** A

**Instructor:** George Sturr

**Textbooks:** *Calculus*, 5<sup>th</sup> ed. by James Stewart

#### MATH 1B, Calculus II

Fall Semester 2007

**Grade:** A

**Instructor:** George Sturr

**Textbooks:** *Calculus*, 5<sup>th</sup> ed. by James Stewart

#### MATH 15, Elementary Statistics

Fall Semester 2007

**Grade:** A

**Instructor:** Michael Eurgubian

**Textbooks:** *Understandable Statistics*, 8<sup>th</sup> ed. by Charles Henry Brase and Corrine Pellillo Brase

#### MATH 1A, Calculus I

Spring Semester 2007

**Grade:** A

**Instructor:** Michael Eurgubian

**Textbooks:** *Calculus*, 5<sup>th</sup> ed. by James Stewart