|  |  |
| --- | --- |
| Joshua Coon  932 B Mountain Laurel Circle SE, Albuquerque NM, 87116  Mobile: 801-427-1285  Work: 505-844-0959  [Jjc16\_1@yahoo.com](mailto:Jjc16_1@yahoo.com)  joscoon@sandia.gov  [www.linkedin.com/pub/joshua-coon/42/a38/184/](http://www.linkedin.com/pub/joshua-coon/42/a38/184/)  <http://drcoonteaching.wordpress.com/>  <https://github.com/jjc16> | |
| Career Objective | I am currently employed as a Data Scientist at Sandia National Laboratories at the Postdoctoral Appointee level. My goal is to obtain employment at the level of technical staff at either a government or industry funded research laboratory. |
| Qualifications Summary | * Extensive experience with data analysis on very large data sets, including chemometric analysis of gas chromatography – mass spectroscopy (GC-MS) data. Experience analyzing data using multiple dimensional reduction techniques, including non-negative matrix factorization and principal component analysis. Expertise in dimensional reduction methods for data sets, data visualization, automated data processing, data analysis algorithm development, least squares algorithms, optimization solvers and routines, and modeling and simulation methods. Extensive experience using machine learning techniques to cluster, partition, statistically test, and understand related data sets and developing models of underlying processes based on results. * Quality control of parts produced through additive manufacturing using analysis of variance (ANOVA) and related methods to assess material statistical properties and influence future design of experiments (DOE). Experience using analysis results to suggest concrete actions for product management teams, including delaying testing on products with statistically significant flaws in manufacture. * Advanced programming skills, including extensive experience with object-oriented programming, program design and debugging, code-repository use, and refactoring. Wrote 20,000+ lines of code in the Matlab language to support a data visualization and manipulation GUI that I designed which implements object-oriented design, parses and mungs large data sets with limited user interaction, and exchanges information with third-party analysis software. Additional experience with C, C++, C#, and Visual Basic, Java, Python, SQL, and HTML. * Extensive experience with simulation of physical systems, optimization algorithms and methods, parametric studies, and Monte Carlo techniques. * Active Department of Energy “Q” level security clearance |
| Current Job | Data Scientist, Sandia National Laboratories, Albuquerque, New Mexico, 2013 – Present  * Wrote 20,000+ lines of Matlab code to develop a robust, user-friendly Graphical User Interface (GUI) to import, analyze, and visualize chemometric data sets. * Analyzed varied and typically very large data sets (“big data”), including statistical data about a manufactured industrial part and chemometric Gas Chromatography – Mass Spectrometry (GC-MS) data that helped ensure the safety of the nuclear stockpile * Gained extensive experience with data space reduction methods, including principal component analysis (PCA), multivariate analysis, matrix factorization, tensor decomposition and compensation for Poisson noise * Gained extensive experience with data mining techniques, including k-means analysis, k-nearest neighbors analysis, neural networks, hierarchical clustering, Bayesian statistics, and neural network analysis * Developed, analyzed, refined, and implemented algorithms for automated parsing and analysis of large data sets, including an algorithm to determine the rank of a factored data matrix * Gained experience in statistical methods of data analysis and product qualification, including (Analysis of Variance) ANOVA tests, Monte Carlo methods, design of experiments (DOE) * Experience integrating the results of both statistical testing and data analysis into production procedures, including revising a product qualification schedule based on early testing results * Developed robust simulation code in the Matlab language to produce realistic simulated elution profiles and mass spectra to isolate noise effects and analyze algorithm efficiency |
| Publications | * “Using MCR-ALS for the Analysis of Weapon Gas Data”, Sandia National Laboratories SAND Report, 2014 *(first author)* * “W80 Gas Analysis Report”, Sandia National Laboratories SAND Report, 2014 * “W76 Gas Analysis Report”, Sandia National Laboratories SAND Report, 2014 * “ HIFU Treatment Time Reduction for Superficial Tumors through Focal Zone Path Selection”, International Journal of Hyperthermia, August 2011 *(first author)* * “HIFU Treatment Time Reduction through Optimal Scanning”, International Journal of Hyperthermia, November 2012 *(first author)* * “Treatment Time Reduction through Parameter Optimization in Magnetic Resonance Guided High Intensity Focused Ultrasound Treatments”, Dissertation, December 2012 |
| Conference Posters & Presentations | * **A Method for Automated Data Extraction and Peak Identification from Large GC-MS Data Sets Using Multivariate Analysis,** accepted for 63rd ASMS Conference on Mass Spectrometry and Allied Topics, 2015 * **“Analysis of GC-MS Data for Complex System Samples Using an Unfolded Multivariate Curve Resolution – Alternating Least Squares (Mcr-Als) Approach”,**Gas Technology IMOG Meeting, 2014 * **“Analysis of GC-MS Nylon 6.6 Data Using Multivariate Curve Resolution – Alternating Least Squares”** 42nd Polymeric Materials Adhesives and Composites (PolyMAC) Conference, 2014 * “PARAFAC Analysis of Nylon 6.6 GC-MS Data”, 7th Annual Postdoctoral Technical Showcase at Sandia National Laboratories, 2014 * “Reimagining ePortfolio Assignments”, AAEEBL Conference, 2012 * “HIFU Treatment Time Reduction through Focal Zone Size and Spacing Selection”, International Symposium on Therapeutic Ultrasound, 2011 * "HIFU Dose Delivery Time Reduction: Focal Zone Size and Path Optimization", Society for Thermal Medicine Annual Meeting, 2009 * "Dose Delivery Time Reduction Through Optimization of Focal Zone Path, Power, and Size”, International Symposium on Therapeutic Ultrasound, 2009 |
| Patents | Technical Advance Submitted, “GC-MS Data Processing GUI and Code Base”, *2015*. |
| Education | Doctorate Degree in Physics  University of Utah, Salt Lake City, Utah, United States, 2012  **Master’s Degree in Physics**  University of Utah, Salt Lake City, Utah, United States, 2012  **Bachelor’s Degree in Physics**  University of Utah, Salt Lake City, Utah, United States, 2005  **Bachelor’s Degree in Mathematics**  University of Utah, Salt Lake City, Utah, United States, 2005  Thesis Summary: I ran computer simulations of Magnetic Resonance guided High Intensity Focused Ultrasound (MRgHIFU) treatments of breast tumors with the goal of reducing treatment times without compromising patient safety or treatment efficacy. To do this, I built a numerical model of human tissue using code in the Matlab language. I then ran over 250,000 computer hours of treatments that investigated the effect of various strategies on treatment times (i.e. whether it’s better to start at the front of the tumor and treat to the back or vice versa). The research also incorporated theoretical, computational, and experimental components, including experience using a 3 Tesla MRI and validations with agar phantoms and in vitro models. The main result from the research was that I was able to discover a new treatment strategy that would reduce treatment times by nearly an order of magnitude under certain conditions versus conventional strategies. |
| Previous Work Experience | Adjunct Professor, Salt Lake Community College, Salt Lake City, Utah, 2012-2013 Taught Calculus I, Calculus II, Business Algebra, and College Algebra, and Ordinary Differential Equations/Linear Algebra  Presented material at a level which was sufficiently rigorous for formal mathematics courses but which could be easily digested by students  Prepared extensive lecture notes, exams, and supplemental material to aid in teaching the class  Attended training sessions for the E-Portfolio initiative – an innovative program that helps students to develop an online resume of projects completed during coursework Instructor, University of Utah, Salt Lake City, Utah, 2012 Taught College Algebra – a course designed to give students in non-scientific majors a basic understanding of mathematics and to fulfill the university requirement for mathematics education  Adapted material extensively to be understood by students with only rudimentary mathematics skills and background  Prepared tests, lectures, quizzes, and classroom notes  Held regular office hours and assisted students with questions about class material Adjunct Professor, Utah Valley University, Orem, Utah 2012 Taught Physical Science 1000 Class – a basic overview of Physics, Chemistry, Geology, and Astronomy  Adapted complicated teaching material so that it could be understood by students with rudimentary scientific and mathematical knowledge  Prepared numerous quizzes, exams, homework assignments, and extra credit assignments for students  Prepared series of lectures using Microsoft PowerPoint assisted with instructional videos from Youtube and other sources and images and links from various educational and scientific internet sites. Item Writer, American Institutes for Research, Washington D.C., 2012 Researched, wrote, and edited informational passages and test questions for the physics portion of the Medical College Admissions Test (MCAT) exam  Gained extensive experience in writing technical passages that could be easily digested by entry level students and testers Research Assistant - Utah Center for Advanced Imaging Research (UCAIR), University of Utah, Salt Lake City, Utah, 2007-2012 Worked on project researching Magnetic Resonance guided High Intensity Focused Ultrasound (MRgHIFU) treatments of breast cancer under an NIH grant  Developed theoretical and numerical methods and results which changed understanding of the field. Published paper has high and growing impact factor.  Wrote two papers, a dissertation, and multiple conference talks and presentations based on research  Assisted with in vivo, in vitro, and phantom validation of simulation results  Research resulted in over 80% treatment time reduction using optimal user-controllable parameters versus non-optimal clinical standard  Wrote a peer reviewed grant proposal for DOD CDMRP and gained extensive experience with technical writing  Developed deep understanding of computational physics, numerical methods, and simulations of physical systems that is applicable to many different industries Teaching Assistant, University of Utah Physics Department, Salt Lake City, Utah 2005-2007 Led discussion sections for all Physics classes in main undergraduate sequence up through quantum mechanics. This includes Laboratory Classes, Classical Mechanics (Calculus and Algebra based), Electricity and Magnetism (Calculus and Algebra based), and Quantum Mechanics. Six semesters of experience total.  Developed deep understanding of basic physics, mathematics, and the application of physics to the real world from teaching and preparing lectures  Learned how to lead a classroom, interact effectively with students, and resolve disputes |
| Consulting | Software Development Consultant for G86 Studios, Salt Lake City, Utah, 2012   * Small startup company specializing in industrial, graphic, user interface, and video game design * Consulted on a project to develop Windows 8 Tablet games using C# in the .Net framework, specifically using the XNA Game Developer Studio Libraries * Learned a good working knowledge of C# programming and how to program using MSDN as a result of the experience |
| Honors & Awards | * National Merit Scholar * Member of two college honor societies |
| Languages | * Native English speaker * Conversational Spanish |