

**Monica Boyce, Ph.D.**  
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## **Professional Overview**

Experienced Ph.D. scientist with 20+ years of lab research, academic, scientific, medical, and biopharmaceutical writing and communication expertise seeking a Data Science role. Proficient in python coding, exploratory data analysis, statistical analysis, data visualization, and machine learning techniques such as model building, cross-validation, decision trees, random forests, time-series analysis, network analysis, principal component analysis, and deep learning. Completed MIT Applied Data Science Program with practical experience in artificial and convolutional neural networks for computer vision applications.

## **Selected Data Science Skills** (Refer to TECHNICAL SKILLS section below for more information)

- Python
- Numpy
- Seaborn
- PANDAS
- Scikit-learn
- Keras
- TensorFlow
- Jupyter Notebooks
- Google Colab
- Git & Github

## **Selected Data Science Portfolio Projects**

- **Machine Learning/Deep Learning:** Projects on Convolutional Neural Networks, Facial Emotion Recognition, and Loan Default Prediction using various methods such as ANN, logistic regression, Decision Trees, Random Forest, SVM, XGBoost, Gaussian Naive Bayes, and K Nearest Neighbor analyses.
- **Data Cleaning:** A project on the identification and correction of data quality using a Loan Default Prediction dataset.
- **Visualization:** A project that demonstrates effective graphical exploration of data using python, numpy, seaborn, and other technologies, based on a Loan Default Prediction project.

## **Selected Certifications and Continuous Learning**

**MIT Applied Data Science Program - MIT Professional Education**  
Ranked 4th in a class of >200 - November 2022

**Making Data Science Work for Clinical Reporting - R Package Development for CI/CD in Pharma**  
Genentech Coursera - April 2023

**MLOps Essentials: Model Development and Integration**  
LinkedIn - February 2023

**MLOps Essentials: Model Deployment and Monitoring**  
LinkedIn Learning - January 2023

**Cert Prep: PMI Agile Certified Practitioner (PMI-ACP)**  
LinkedIn Learning - November 2022

**PyTorch Essential Training: Deep Learning**  
LinkedIn Learning - November 2022

### **Git Intermediate Techniques**

LinkedIn Learning - October 2022

### **SQL for Data Analysis**

LinkedIn Learning - October 2022

### **Object-Oriented Design**

LinkedIn - February 2023

### **Agile Software Development**

LinkedIn - February 2023

### **Agile Software Development: Extreme Programming**

LinkedIn - February 2023

## **Currently In-Process**

### **Linear Algebra for Machine Learning and Data Science**

OpenAI and DeepLearning.AI - April-May 2023

### **Supervised Machine Learning: Regression and Classification**

OpenAI and DeepLearning.AI - May 2023

### **Foundations of Project Management Certificate Program**

Google Coursera - April-May 2023

### **Getting Started with Data Visualization in R**

Johns Hopkins University - Winter 2023

### **C++ Essential Training**

LinkedIn Learning - Winter 2023

### **PMI - Agile Certified Practitioner (PMI-ACP)**

LinkedIn Learning - Fall 2022

### **Neo4j Certified Graph Data Science Professional**

Neo4j GraphAcademy - Fall 2022

### **Amazon Web Services (AWS) - Machine Learning Specialty**

Amazon - Fall 2022

### **Tableau Essential Training**

LinkedIn Learning - Fall 2022

### **Microsoft Certified: Azure Data Scientist Associate**

Microsoft - February 2023

### **Microsoft Certified: Power BI Data Analyst Associate**

Microsoft - January 2023

## **Education**

**MIT Applied Data Science Program - Massachusetts Institute of Technology Professional Program** (Fall 2022) 4th in class - For a detailed treatment of the coursework in this program, refer to the end of this resume.

**Ph.D. Cell and Developmental Biology**, Emory University, Atlanta, GA, 1994

- **Dissertation:** "Examination of Centrosomal Components: Studies of in vivo gamma tubulin function"
- This work focused on evaluating the function of gamma tubulin, a novel component in the nucleation of

- microtubules, and its role in mitosis and other microtubule-dependent dynamics.
- Later studies included the identification of novel centrosomal components through phage expression library screening.
- Relevant Publications: Joshi, H.C., et al. 1992 **Nature** 356:80-83; Palacios, M.J. et al. 1993 **Journal of Cell Science** 104(2):383-389; Shu, H.B., et al. 1995 **Journal of Cell Science** 108(9):2955-2962.

**B.S. Biology**, University Of Georgia, Athens, GA, 1990

## **Postdoctoral Fellowships**

**Tufts University School of Veterinary Medicine, N. Grafton, MA (3/97 - 2/98)**

- Contributed to the successful cloning of the first transgenic goats carrying an anti-clotting enzyme transgene developed at Genzyme Transgenics. Optimized in vitro meiotic maturation cultures in the goat system.
- Advisor: Dr. Eric Overstrom, Department of Biomedical Sciences
- Relevant Publication: Baguisi, A. et al. 1999 **Nature Biotechnology** 17:456-461.

**Tufts University School of Medicine, Boston, MA (7/95 - 12/96)**

- Investigated functional aspects of various cytoskeletal proteins participating in cell cycle dynamics during meiotic maturation of mammalian oocytes.
- Dr. David Albertini, Department of Anatomy and Cell Biology

**University Of Southern California, Children's Hospital, Los Angeles, CA (6/94 - 6/95)**

- Investigated expression of N-myc in primary neuroblastoma culture cells prepared from pediatric neuroblastoma patients to examine the relationship between N-myc expression and disease process.
- Dr. Pat Reynolds, Department of Hematology and Oncology

## **General Transferable Skills and Characteristics**

- Possess a strong work ethic and am committed to achieving professional excellence.
- Dedicated to continuous learning and expanding knowledge and skills to advance career goals and contribute to the success of the organization.
- Highly motivated to acquire new skills and knowledge domains outside of previous experience to bring fresh perspectives and innovative solutions to the table.
- Welcome constructive criticism and feedback as opportunities for growth and improvement.
- Value the well-being and professional development of co-workers and believe in fostering positive relationships and communication to achieve team and company goals.
- Possess deep and diverse project management experience, with a track record of successfully managing complex projects on time, within budget, and to the highest quality standards.

## **Summary of Relevant Academic, Corporate, Education & Industry Positions**

**Science Instructor - North Brookfield High School (2020 - 2022)**

- Developed curricula and created all course content for Anatomy & Physiology, Forensic Science, AP Environmental Science, and Biology courses.
- Taught in-person and synchronous/asynchronous remote courses to a diverse range of students and tailored instruction to meet their individual needs and learning styles.
- Produced extensive and rigorous scientific educational presentations on a daily basis, effectively communicating complex scientific concepts to students with varying levels of knowledge and understanding.
- Utilized data-driven approach to instruction by continuously assessing student engagement and performance with custom crafted formative and summative assessments.
- Maintained a positive and engaging learning environment using effective classroom management techniques to support students facing learning challenges as well as those prepared to work beyond their grade level.

### **Transferable Skills:**

- Communicated complex technical concepts to diverse audiences.

- Produced high-quality instructional materials and experiences with attention to detail.
- Created multimedia presentations and assessments to support student learning and engagement.

**Substitute Instructor (2018 - 2020) Tantasqua Union 61 Regional School District**

**Director - Caprine Dairy Husbandry (2008 - 2018)**

- Established and maintained a herd of approximately 15 - 20 milking La Mancha goats.
- Designed and directed construction of housing and milking parlor facilities, including vacuum milking equipment and milk pasteurization.
- Managed the breeding program and livestock maintenance, including obtaining and maintaining a guard animal for herd protection (Llama).
- Oversaw sales of excess animals to processing facilities.
- Produced a range of high-quality dairy products from goat milk, including raw and pasteurized milk, fresh cheese (chevre), yogurt, and kefir.

**Transferable Skills:**

- Built relationships with experienced dairy goat farm mentors to gain the necessary knowledge to initiate program start-up
- Managed complex, multi-year project planning

**Postdoctoral Special Project - University of Connecticut Health Center, Farmington, CT (2010 - 2012)**

- Conducted research to characterize human sarcomere ultrastructural morphology and integrity in aging, using SHG microscopy for data capture.
- Investigated function, dynamics, and potential mechanisms of the novel cell-cell fusogen EFF-1 in *C. elegans* embryos, including creating novel transfected worm strains via microinjection to further dissect EFF-1 function in situ.
- Assisted in the production of manuscripts for publication and grants for submission under the guidance of Dr. William Mohler in the Department of Genetics and Developmental Biology.

**Transferable Skills:**

- Collaborated in diverse teams to complete successful research projects.
- Conducted precise scientific research and experimentation.
- Demonstrated strong written communication skills in manuscripts and grants.
- Analyzed scientific data with expertise and accuracy.
- Adapted to changing research needs with problem-solving skills and flexibility.

**Medical Writer - ORC Guideline (Remote) (2009 - 2010)**

- Conducted thorough evaluation of medical and scientific literature to determine its relevance to the production of white papers.
- Summarized medical and scientific literature at an expert level to facilitate the development of physiological computer models.
- Analyzed and captured key data from medical and scientific studies, which were critical for the development of the computer models.

**Transferable Skills:**

- Managed projects with skill in budgeting, timeline management, and stakeholder communication.
- Quickly learned and presented complex scientific concepts clearly and engagingly.
- Organized effectively with attention to detail and multitasking abilities.

**Conference Producer and Manager - IBC Life Sciences, Westborough, MA (2007 - 2008)**

- Plan, organize and execute scientific conferences in various fields including molecular diagnostics, systems biology, genomics, proteomics, metabolomics, biomarkers, next-generation sequencing technologies, biofuels, and protein therapeutics development and production.
- Develop conference programs and agendas, invite and secure expert speakers, and coordinate logistics for events.

- Collaborate with various stakeholders, including scientific advisory boards, industry partners, and attendees to ensure successful conferences.
- Stay up-to-date on scientific and technological advancements to identify new conference topics and areas of interest.
- Analyze feedback and performance metrics to continuously improve conference quality and attendee satisfaction.

**Transferable Skills:**

- Planned and executed scientific conferences in various fields, from program development to logistics coordination.
- Collaborated with stakeholders to ensure successful events and utilized strong communication skills.
- Adapted to diverse scientific fields and industries with flexibility and ease.

**Document Specialist - CellExchange, Cambridge, MA - (7/05 – 8/07)**

- Managed and reviewed documents related to the Software Development Life Cycle (SDLC) for quality control and editing.
- Ensured accuracy and completeness of technical documents
- Collaborated with cross-functional teams to identify areas for process improvement and streamline document review processes.

**Transferable Skills:**

- Ensured quality control and accuracy of technical documents related to SDLC.
- Managed documents with attention to detail and accuracy.
- Collaborated with cross-functional teams to streamline document review processes

**Clinical Writer - clinivation, Inc. Framingham, MA – (2005)**

- Wrote, edited, and performed QC reviews for various clinical documents in compliance with regulatory and ICH guidelines, including new and legacy Clinical Study Reports, Case Report Forms, Investigator's Brochures, Informed Consent Forms, and Study Protocols.
- Verified accuracy and consistency of data sets for clinical studies.
- Facilitated and proofread translations of clinical documents, including Spanish translations.
- Conducted thorough evaluations of clinical literature and data to support development of high-quality clinical documents.

**Transferable Skills:**

- Wrote and edited clinical documents with technical expertise.
- Conducted thorough research to support high-quality clinical document development.

**Medical Information Specialist (7/04 - 1/05)**

Global Medical Affairs - Cardiovascular - INTEGRILIN (eptifibatide)

**Millennium Pharmaceuticals Inc.** Cambridge, MA

- Collaborated with a diverse team to communicate results from clinical studies and relevant documentation to healthcare providers through Medical Information Letters.
- Wrote, edited, and performed QC reviews for medical information letters and related materials, ensuring compliance with relevant regulatory and ICH guidelines.
- Conducted thorough evaluations of clinical studies and data to support development of high-quality medical information letters and materials.
- Stayed up-to-date on scientific and technological advancements to ensure the accuracy and relevance of medical information.

**Transferable Skills:**

- Collaborated with diverse teams to communicate clinical study results to healthcare providers through Medical Information Letters.
- Wrote, edited, and performed QC reviews for medical information materials in compliance with regulatory and ICH guidelines.
- Conducted thorough evaluations of clinical studies and data to support high-quality medical

- information materials.
- Stayed up-to-date with scientific and technological advancements to ensure accuracy and relevance of medical information.

**Scientific Writer (5/04 - 7/04) - CompuCyte Inc.** Cambridge, MA

- Authored and edited technical documents and marketing materials for CompuCyte, a pioneer in laser scanning cytometry technology.
- Demonstrated ability to translate complex scientific concepts into clear and concise language for a variety of audiences.

**Transferable Skills:**

- Strong technical writing and editing skills
- Ability to translate complex technical concepts into clear and concise language
- Effective communication skills to convey technical information to a variety of audiences

**Project Manager & Technical Writer (5/01 – 11/03)**

**Applied Research & Development**

**EXACT Sciences Corp.**, Marlborough, MA

- Collaborated with CTO to create patent disclosures for new methods and devices.
- Managed scientific and technical staff and their projects, including project planning and auditing, as a project manager for the Applied Research group.
- Analyzed and recommended improvements for in-house electronic laboratory notebooks and documentation systems.
- Created abstracts, figures, and tables from raw data, and managed the logistics of presentations at national meetings.
- Completed project management training and participated in technical transfer project life cycle development.
- Analyzed raw research and clinical data for publication and posters, wrote research manuscripts, and submitted them to leading journals for publication.
- Published research in a leading scientific journal: Boynton KA, et al. 2003 Clinical Chemistry 49(7):1058-1065.

**Transferable Skills:**

- Developed and submitted patent disclosures, managing intellectual property.
- Led project planning for scientific and technical staff, utilizing project management skills.
- Composed manuscripts and created abstracts, figures, and tables from raw data, demonstrating proficiency in scientific writing and data analysis.
- Conducted staff interviews, gathering and analyzing project requirements.
- Conducted research and analysis, utilizing literature search and technical analysis.
- Communicated and collaborated with external collaborators and project participants.
- Authored and submitted scientific manuscripts to leading journals, resulting in the publication of this mission critical paper: Boynton KA, et al. 2003 Clinical Chemistry 49(7):1058-1065.

**Technical Specialist 4/98 - 6/99**

**Lahive & Cockfield, L.L.P.**, Boston, MA

- Drafted provisional and regular U.S. patent applications based on invention disclosures from biotechnology corporations.
- Prosecuted various U.S. and foreign patent applications independently and in collaboration with senior partners and associates.

**Transferable Skills:**

- Proficient in drafting and prosecuting U.S. and foreign patent applications based on biotechnology invention disclosures.
- Attention to detail and technical expertise in biotechnology.
- Effective communication and collaboration skills with senior partners and associates.
- Knowledgeable in U.S. and foreign patent laws, regulations, and patent search analysis.

## Technical Skills

### Bioinformatics

- Data mining across DNA, RNA and proteins in **Prosite, InterPro, BLAST, GenBank, MEDLINE, CLUSTAL, OMIM, PDB, BioCyc, ClinVar, ChEMBL, Gene, RefSeq, GATK, Genome,**

### Cell Biology

- Immunocytochemistry of culture cells as well as mammalian oocytes for both immunofluorescence and electron microscopy.
- Development of embryonic stem cell culture.
- General cell culture techniques.
- Set up and maintenance of chlamydomonas and diatom bioreactors for scaled-up production.
- Extensive experience with Zeiss microscopes (including the inverted axiovert series).
- Experience with electron microscopes.
- Standard culture and passaging of *C. elegans*.
- Preparation of *C. elegans* embryo mounts and 4-D confocal microscopy.

### Computer Languages & Technologies

- Python
- Numpy
- Scipy
- PANDAS
- Matplotlib
- Seaborn
- Sklearn
- Keras
- TensorFlow
- Jupyter Notebooks
- SQL
- Github
- GitLab
- Google Colab
- HTML
- UNIX, Linux, SGI IRIX, MacOS, Windows
- Trello
- Slack
- Excel
- Google Sheets
- Experience with JavaScript.
- Use of software packages for the processing and manipulation of large multidimensional confocal microscope images
- Extensive experience with major word processing software, **MS Office, Open Office, MacOS Pages**
- Experience with most of the **Adobe Creative Cloud suite**, including: **Photoshop, Acrobat, InDesign, Illustrator, Lightroom, Audition, Premiere Pro, Dreamweaver.**

### Data Science

- Statistical Methods
- Data Cleaning
- Data Mining and Evaluation
- Data Analytics
- Data Visualization Methods
- Principal Component Analysis
- Linear Regression
- Logistic Regression
- Bootstrapping
- Cross-Validation Methods
- Model Building
- Unsupervised learning
- Supervised learning

- Decision Trees
- Random Forests
- Time-series analysis
- Network Analysis
- Feature Engineering
- Deep Learning
- Neural Networks
- Convolutional Neural Networks
- Graph Neural Networks
- Recommendation engines
- Tensors and Neural Networks for Recommendation Systems

### **Micromanipulation**

- Mammalian oocyte enucleation and nuclear transfer.
- Microinjection of macromolecules such as DNA, RNA, antibodies and submicron magnetic beads into mammalian culture cells and mammalian oocytes.
- Trained in ICSI and in the manufacture of ICSI microinstruments.
- Manipulation of mammalian oocytes for microinjection and immunofluorescence.
- Transfection of *C. elegans* by microinjection of whole worms.

### **Molecular Biology**

- Conducted RFLP mapping of marine diatom using shotgun cDNA cloning.
- Constructed and analyzed phage expression libraries to identify novel gene products at the mammalian centrosome.
- Transfected bacteria and purified RNA/DNA from bacterial, plant, and mammalian sources.
- Proficient in nucleic acid electrophoresis, Northern/Southern blotting, and random primer labeling.

### **Mouse Husbandry**

- General handling, priming, breeding and care of mice.
- Superovulation and sacrifice of mice for oocytes.
- Surgical techniques for the proper isolation of oocytes from ovaries/bursa from a variety of species.

### **Project Management**

- Proficient in Systems Development Life Cycle planning (SDLC) and Unified Modeling Language (UML)
- Completed Project Management training at Worcester Polytechnic Institute, MA
- Experienced with MS Office suite and PM tools including MS Project.

### **Protein Biochemistry**

- Protein purification
- SDS PAGE electrophoresis
- Western, Southern and Northern blotting with radioactive and non-radioactive detection systems
- Antibody purification (polyclonal antibody production in rabbits)
- Photospectrophotometry for ligand binding kinetics

### **Teaching**

- 9-12 grade Science Instructor
- Elementary school after-school 'Hands-On-Science' Instructor
- Substitute Teacher K-12
- Teaching Assistant for undergraduate Cell Biology at Emory University

### **Writing**

- Extensive experience with writing such as original manuscripts, dissertation, and technical aspects of biotechnology patent applications.
- Scientific writing for molecular genetics and genomics research including articles, abstracts, and poster presentations on PCR, genomic scanning, and cancer detection.
- Grant writing experience for NIH, NSF, NCI, and USDA.
- Experience in technical writing for biotechnology patent applications in genomics and proteomics.
- Drafting and filing biotechnology patent applications and patent prosecution.



## **Special Research Projects**

**Sigma Xi Scientific Research Society** Summer Molecular Biology Research Scholarship at University of Alaska, Fairbanks, AK (1989)

- Generated cDNA library from marine diatom and performed initial restriction enzyme analysis.
- Dr. Gerry Plumley, Institute of Marine Science

## **Publications**

Baguisi, A Behboodi, E., A., Melican, D., Pollock, J., Destrempe, M., Williams, J., Nims, S., Midura, P., Palacios, M.J., Ayres, S., Denniston, R., Hayes, M., Ziomek, C.A., Meade, H.M., Godke, R.A., Gavin, W., Overström, E.W., Echelard, Y. (1999): Production of transgenic goats by somatic cell nuclear transfer. **Nature Biotechnology** 17:456-461.

Shu, H.B., Li, Z.Q., Palacios, M.J., Li, Q., Joshi, H.C. (1995): A transient association of gamma-tubulin at the midbody is required for the completion of cytokinesis during mammalian cell division. **Journal of Cell Science** 108(9):2955-2962.

Palacios, M.J., Joshi, H.C., Simerly, C., Schatten, G. (1993): Gamma-tubulin reorganization during early mouse development. **Journal of Cell Science** 104(2):383-389.

Joshi, H.C., Palacios, M.J., McNamara, L., Cleveland, D.W. (1992): Gamma-tubulin is a centrosomal protein required for cell cycle dependent microtubule nucleation. **Nature** 356:80-83.

(Written in capacity as technical writer): Boynton KA, Summerhayes IC, Ahlquist DA, Shuber AP. (2003): DNA integrity as a potential marker for stool-based detection of colorectal cancer. **Clinical Chemistry** 49(7):1058-1065.

## **Abstracts and Presentations**

Palacios, M., Denniston, R., Reggio, B., Echelard, Y., and E.W. Overstrom. 1998 "Progression of cytoskeletal and nuclear organization during maturation of goat oocytes in vitro" *Theriogenology* 49:189.

International Embryo Transfer Society (IETS) Boston "The in vitro maturation of goat oocytes", 1997

ASCB Annual Meeting New Orleans "A transient association of gamma-tubulin at the midbody is required for the completion of cytokinesis during mammalian cell division" Poster #1402, 1993

ASCB Annual Meeting Denver "Gamma-tubulin reorganization during early mouse development" Minisymposium #11, 1992

ASCB Annual Meeting Boston "Gamma-tubulin is a centrosomal protein required for cell cycle dependent microtubule nucleation", 1991

ASCB Annual Meeting Washington, D.C. "Determination of calcium binding domains in Calmodulin by Terbium luminescence", 1983

## **Patents**

"MicroElectromechanical devices useful for manipulating cells, kits thereof, methods of use thereof, and methods of making" Issued

## **Honors and Awards**

American Society of Cell Biology (ASCB) Minority Travel Award: 1991, 1992, and 1993

Sigma Xi Scientific Research Society Summer Molecular Biology Research Scholarship, 1989 Bausch and Lomb Science Award, 1984

National Honor Society, 1984

Minority Biomedical Research Scholarship, Incarnate Word College, San Antonio, TX, 83-84

## **Details regarding the MIT Applied Data Science Program**

**MIT Applied Data Science Program - Massachusetts Institute of Technology Professional Program (Fall 2022)** 4th in class

Intensive coursework on the theory and application of a broad range of methods and best practices in Data Science.

Completed these courses:

### **Python Coding Fundamentals**

### **Statistical Foundations for Data Science**

#### **Data Analysis and Visualization**

- Exploratory Data Analysis
- Methods and coding for data visualization
- Dimensionality Reduction
- Principal Component Analysis
- Unsupervised Learning
- K-means clustering
- Network Analysis
- **PROJECTS:**
  - Breast Cancer Screening
  - Genomic Data Clustering
  - MNIST Digit Visualization
  - Spherical Cluster Comparison
  - Customer Segmentation
  - Geographic Clustering
  - ENRON Network Analysis
  - CAVIAR Network Analysis
  - Stock Portfolio Optimization

#### **Machine Learning**

- Model architecture, design, coding, deployment, training, validation, assessment
- Supervised Learning - Linear Regression methods and applications, including coding
- Regularization
- Ridge Regression
- Lasso Regression
- Cross-Validation
- Supervised Learning - Classification - Logistic Regression
- Linear Discriminant Analysis (LDA) and Quadratic Discriminant Analysis (QDA)
- Bootstrapping
- **PROJECTS:**
  - Sales Prediction model design, testing
  - Loan Default Prediction model design, testing
  - Employee Attrition Prediction model design, testing
  - Housing Price Prediction model design, testing

#### **Deep Learning**

- Fundamentals of Artificial Neural Networks
  - Activation and loss functions
  - Optimizers
- Fundamentals of Convolutional Neural Networks
- Transfer Learning
- Graph Neural Networks (GNN)
- **PROJECTS:**
  - COVID-19 Chest X-Ray Classification model design, testing
  - Brain Tumor Identification - CNN model design, testing
  - Rice Type Classification - CNN model design, testing

- Fashion MNIST Image Classification model building and testing
- SVHN Digit Recognition via ANN and CNN model design, testing
- University Admissions Prediction model design, testing
- Audio MNIST Digit Recognition model design, testing
- CIFAR-10 Image Classification model design, testing
- Food Image Classification model design, testing
- Citation Network Classification with GNN model design, testing

### **Practical Data Science**

- Decision Tree design, coding, training, evaluation
- Pruning
- Bagging
- Random Forests
- Time Series Analysis
- Stationary and Non-Stationary Time Series
- Random Walk
- Forecasting Methods
- Autocorrelation (ACF) and Partial Autocorrelation Functions (PACF)
- ARMA
- ARIMA
- **PROJECTS:**
  - Forecasting Consumer Price Index
  - Bitcoin Price Prediction
  - Crude Oil Production Forecasting
  - Employee Attrition Prediction
  - Hotel Booking Cancellation Prediction
  - Hospital Length of Stay (LOS) Prediction
  - Potential Customers Prediction
  - Celestial Object Prediction
  - Titanic Survival Prediction

### **Recommendation Systems**

- Interaction Matrix
- Clustering
- Rank (Popularity) based filtering
- Collaborative Filtering
- Latent Features
- Tensors
- Matrix Estimation
- Singular Value Thresholding (SVT)
- Singular Value Decomposition (SVD)
- Matrix Estimation via Content-Based Filtering
- Matrix Estimation for Time Series Forecasting
- **PROJECTS:**
  - Movie Recommendation System
  - Yelp Restaurant Recommendation System
  - Book Recommendation System
  - Amazon Product Recommendation System

### **CAPSTONE PROJECT - Facial Emotion Recognition Portfolio**

- Designed, trained, and tested computer vision models using deep learning and artificial intelligence techniques to predict human emotion from photos
- Used CNN models to perform multi-class classification on an image dataset to identify expression-emotion relationships
- Achieved highest model performance in class with 93% accuracy.
- Repo: <https://mpbds2022.github.io/Data-Science/>