MANISH U. KURSE, Ph.D.

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Summary R**esearch scientist and engineer** passionate about data driven solutions to problems of business/customer impact. With experience in academia and industry, designing and performing experiments to generate data, and using **machine learning, mathematical modeling and computational tools** to draw insightful conclusions from that data.

Skills

- Machine learning, data analysis, statistics, mathematical modeling, optimization
- Designing and running experiments to collect data (engineering bench-top, preclinical studies)
- Communication of results to business leaders, regulatory agencies and research community
- Programming: Matlab, C/C++, Python, SQL

Education

University of Southern California, Los Angeles, CA *2012*
Ph.D. and M.S., Biomedical Engineering, GPA: 3.96/4.0
Dissertation: Inference of computational models of tendon networks via sparse experimentation.

Cornell University, Ithaca, NY *2007*
Graduate course work, Mechanical Engineering, GPA: 4.03/4.0

Indian Institute of Technology (IIT) Madras, Chennai, India *2006*
Bachelor of Technology, Mechanical Engineering GPA: 9.08/10.0

Work Experience

Research Assistant, University of Southern California *2007-2012*
Developed data-driven models of the human finger from experimental data and demonstrated that these models were more accurate representations of the anatomy than those obtained from conventional modeling techniques in biomechanics.

Machine learning:

- Implemented gradient based heuristic optimization algorithms in Matlab to infer models of the human finger from an experimental dataset consisting of input tendon forces and resulting fingertip force output.
- Programmed these algorithms to run on parallel processors using Matlab Parallel Computing Toolbox and Distributed Computing Server on the USC cluster.
- Implemented symbolic regression using Eureqa to determine analytical functions defining finger movement from an experimental dataset collected using human cadaveric fingers.

Mathematical modeling:

- Developed a novel non-linear finite element method (FEM) simulation environment in C++ and Matlab to model the mechanics of elastic tendon networks (Evaluation of the cost function).

Experimental data gathering:

- Designed experiments to gather force and motion data from computer-controlled actuation of the tendons of 11 human cadaveric hands.

Senior R&D Engineer, Boston Scientific Neuromodulation, Valencia, CA *2012-present*

Boston Scientific is one of the largest medical device companies in the United States.

- Played a key role in obtaining ImageReady™ Head-Only MRI labeling for the Precision Spectra™ Spinal Cord Stimulation system, Boston Scientific's first MRI conditional neuromodulation system in the US that was critical for Boston Scientific to meet competition in the Neuromodulation market.
  - Determined thresholds of clinical safety based on literature study and mathematical analysis.
  - Provided technical support for regulatory submission and participated in subsequent conversations with the US Food and Drug Administration (FDA) enabling smooth approval of the submission.
- Executed pre-clinical studies to collect biological data on which I performed statistical analyses to define a patient safety threshold for MRI conditional neuromodulation systems.
- Successfully defined strategy and test methods to determine MRI safety of active implantable systems. This strategy is now being used across different projects to design new MRI conditional systems.
- Designed experiments and performed data analysis to obtain mathematical model that predicts behavior of system in MRI.

Intern Research Consultant, Deallus Inc., Los Angeles, CA *2011*

Deallus is a startup that provides strategy and competitive intelligence consulting services to clients in the pharmaceutical and biotechnology industry.

- Conducted research to gather competitive intelligence in new drug/diagnostic development and commercialization.
- Analyzed data and presented key findings to clients from the biotechnology-pharmaceutical industry aiding them in strategy development and decision-making.

Projects/ Courses

- Machine learning (USC), Applied Mathematics I and II (Cornell), Statistics (USC), Advanced Dynamics (USC), Linear Control Systems (USC), Non-linear Dynamics (USC)
- Self taught: SQL (Stanford Online), Machine Learning (Andrew Ng, Coursera)

Honors/ Awards

Knowledge Driven Product Development (KDPD) Award, Boston Scientific *2013*

Meaningful Innovation Award, Boston Scientific *2013*

Checkered Flag Award, Boston Scientific (awarded for going above and beyond to make a difference to a program supporting company goals) *2012, 2013*

Olin Fellowship for graduate study, **Cornell University** *2006*