

# Rinu Sebastian

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I am a Research Assistant at Keck School of Medicine of USC seeking admission in Doctoral program under Neuroscience. My main research field is **neural signal processing**. My other research interests include rehabilitation, gait modelling, brain stimulation and inverse problems.

## EDUCATION

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- University of Southern California (USC), Los Angeles** *Jan. 2017 – Dec. 2018*  
**Master of Science** in Electrical Engineering  
GPA: 3.38/4.0
- Mahatma Gandhi University (MG University), Kerala, India** *Aug. 2009 – May 2013*  
**Bachelor of Technology** in Electronics & Communication Engineering  
GPA: 3.53 (79.36/100)

## RESEARCH EXPERIENCE

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- Dept. of Neurosurgery, Keck School of Medicine of USC** *Aug. 2018 – Present*  
Advisors: Dr. Brian Lee & Prof. Spencer Kellis
- Investigating effects of frequency and amplitude of stimulation pulse during deep brain stimulation (DBS) for functional mapping of brain in epilepsy patients.
  - Examining intracranial signals from limbic structures to calculate efficacy of these structures in detecting epilepsy.
  - Involving in neural and behavior data collection, managing data pre-processing pipeline and enhancing signal analysis tools.
- The Saban Research Institute at Children's Hospital Los Angeles** *May 2018 – Dec 2018*  
Advisor: Prof. Natasha Lepore
- Incorporated iterative curvature based interpolation (ICBI) approach and improved the quality of low rank total variation (LRTV) algorithm on super-resolved MRI volume by 5%.
  - Reviewed computational algorithms to enhance low-resolution MRIs to detect and segment lesions in 200 children with sickle cell disease.
- Brain Body Dynamics Lab** *May 2017 – Aug. 2017*
- Explored relationship between bio signals (EEG and EMG) generated while subjects exerted force on test objects (spring, dowel) and observed non-existence of correlation between signals and force.

## PUBLICATIONS

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- Beta-Band Power Modulation in the Human Hippocampus during a Reaching Task**  
Roberto Martin del Campo-Vera, Angad S. Gogia, Kuang-Hsuan Chen, **Rinu Sebastian**, Daniel R. Kramer, Morgan B. Lee, Terrance Peng, Ali Tafreshi, Michael F. Barbaro, Charles Y. Liu, Spencer Kellis, and Brian Lee.  
Status: Manuscript under review
- Beta-Band Modulation in the Human Hippocampus during a Conflict Response Task**  
Kuang-Hsuan Chen, Angad S. Gogia, Roberto Martin del Campo-Vera, **Rinu Sebastian**, Morgan B. Lee, Daniel R. Kramer, Terrance Peng, Ali Tafreshi, Michael F. Barbaro, Charles Y. Liu, Spencer Kellis, and Brian Lee.  
Status: Manuscript under preparation

## INDUSTRIAL EXPERIENCE

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- Tata Consultancy Services Ltd.** *Jan. 2014 – Oct. 2016*  
Performance Test Engineer
- Conducted performance testing of middleware and frontend layers of an e-commerce platform, investigated test run results to identify bottlenecks, hosted meetings to rectify defects.
  - Led a project team of 5 engineers to plan and estimate resources for testing activities and improved average time for load and performance planning by 30%.

## COURSE PROJECTS

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### Neural decoding for decision making

USC

Guide: Prof. Maryam Shanechi

Fall 2018

- Modeled neuron activity of medial prefrontal cortex as homogeneous Poisson point process to estimate decision (position) made by rats using maximum likelihood estimator.

### Sit-to-Stand-to-Step modeling

USC

Guide: Prof. Francisco Valero-Cuevas

Fall 2017

- Employed Monte Carlo simulation to analyze experimental data collected in laboratory using motion capture camera system during sit-to-stand-to-step task.
- Determined minimum number of lower extremity muscles needed to produce by optimizing sum of vertical ground reaction force (vGRF) for task and compared results using Pareto analysis of sum of vGRF production of 16 muscle groups.

### Object removal and infilling

USC

Guide: Prof. Justin Haldar

Fall 2017

- Designed and implemented code to remove undesirable objects from any color image.
- Filled void area with candidate patches based on exemplar inpainting algorithm by minimizing sum of square distance (SSD) of neighboring patch and candidate patch to preserve continuity of structures in image.

### Text extraction from videos

MG University

Guide: Prof. Rajesh Roy Cherian

Spring 2013

- Identified and separated embedded texts from video using filtering methods and connected component Algorithm

### Video streaming with live human detection

MG University

Guide: Prof. Nisha R

Fall 2012

- Designed and implemented wireless surveillance robot to transmit serial bursts of images on real-time basis using Zigbee communication protocol.

## SKILLS

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- Languages: Python, C++, C
- Application Packages and Libraries:: Matlab, GNU Octave, Scilab, EEGLab, FSL, BrainSuite, Chronux, SVN, Git, AWS, Google Cloud, HP LoadRunner, HP Analysis, Eclipse, Visual Code Studio, L<sup>A</sup>T<sub>E</sub>X, OpenCV, Tensorflow

## TEACHING EXPERIENCE

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- Conducted one day workshop on Python and image processing applications for IEEE student members.

## HONORS AND ACHIEVEMENTS

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- Recipient of All India Council for Technical Education (AICTE) approved merit-based 100% tuition fee waiver during B.Tech program (2009-2013)
- Winner of 2011 R10 (Asia-Pacific zone) IEEE ethics competition held as a part of all Kerala students congress (AKSC) at Chenganoor Engineering College

## LEADERSHIP/ SERVICE

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- Organizing Chair:** Drafted the winning proposal for the 1st combined all Kerala student congress (AKSC) - Women in Engineering (WIE) conference, structured the master-plan, speakers, budget and schedule to host around 50% of the IEEE Kerala Region Student population (400+ students)
- Co-ordinator:** Organized student teacher and researcher (STAR) program in Adam Public School (Mookkanoor, Kochi) as a part of science, technology, engineering and mathematics (STEM) outreach project

*Curriculum vitae (CV) updated on November 11, 2019*