

EDUCATION

- **New York University - Center for Data Science (Courant) (NYU CDS)** New York City, USA
Ph.D. in Data Science; **CGPA:** 4/4 Sept 2019 - Present
 - Advisors: *Prof. Carlos Fernandez-Granda and Prof. Narges Razavian*
 - Key Courses: *Communication in the Mathematical Sciences, Independent studies, Research rotation*
- **New York University - Center for Data Science (Courant) (NYU CDS)** New York City, USA
Master of Science in Data Science; **CGPA:** 3.95/4 Sept 2017 – May 2019
 - Key Courses: *Mathematics of Deep Learning, Inference and Representation Learning, Deep Learning for Medicine, Natural Language Processing and Representation Learning, Machine Learning, Mathematical tools for Data Science, Deep Learning (Yann LeCun), Probability and Statistics, Python Programming for Data Science, Big Data*
- **Indian Institute of Management, Bangalore (IIMB)** Bangalore, India
Post Grad. Diploma in Mgmt. (equivalent to MBA); **CGPA:** 3.55/4 (Rank: 16/410) Jun 2014 – Mar 2016
 - Major: **Business Analytics**; Minor: **Finance**
 - Key Courses: *Biz. Analytics and Intelligence, Applied Multivariate Data Analysis, Quant. Methods - 1 & 2*
 - Received perfect A's in all the Finance, Marketing and Business Analytics courses
- **Institute of Chemical Technology (ICT)** Mumbai, India
Bachelor of Chemical Engineering; **CGPA:** 8.93/10.00 (Top 10% of the Class) 2010 – 2014
 - Key Courses: *Biological Sciences, Biochemical Engineering, Organic Chemistry, Inorganic Chemistry, Physical Chemistry, Applied Mathematics -1,2,3,4*

PUBLICATIONS AND PRE-PRINTS

* *equal contribution*

1. "Intermediate layers matter in momentum contrastive self supervised learning" [ArXiv]
Authors: Aakash Kaku, Sahana Upadhyaya, Narges Razavian
Proc. 35th Conference on Neural Information Processing Systems (**NeurIPS**), 2021
2. "Sequence-to-Sequence Modeling for Action Identification at High Temporal Resolution" [ArXiv]
Authors: Aakash Kaku, Kangning Liu*, Avinash Parnandi*, Hareesh Rengaraj Rajamohan, Kannan Venkataramanan, Anita Venkatesan, Audre Wirtanen, Natasha Pandit, Heidi Schambra, Carlos Fernandez-Granda*
Under review for CVPR 2022
3. "Deep Probability Estimation" [ArXiv]
Authors: Sheng Liu, Aakash Kaku*, Weicheng Zhu*, Matan Leibovich*, Sreyas Mohan*, Boyang Yu, Laure Zanna, Narges Razavian, Carlos Fernandez-Granda*
Under review for ICML 2022
4. "PrimSeq: a deep learning-based pipeline to quantitate rehabilitation training" [ArXiv]
Authors: Avinash Parnandi, Aakash Kaku, Anita Venkatesan, Audre Wirtanen, Natasha Pandit, Hareesh Rengaraj Rajamohan, Kannan Venkataramanan, Dawn Nilsen, Carlos Fernandez-Granda, Heidi Schambra
Under Review for PLOS Digital Health
5. "Towards data-driven stroke rehabilitation via wearable sensors and deep learning" [ArXiv]
Authors: Aakash Kaku, Avinash Parnandi*, Anita Venkatesan, Natasha Pandit, Heidi Schambra, Carlos Fernandez-Granda*
Proceedings of Machine Learning Research (**MLHC**), 2020
6. "Be Like Water: Robustness to Extraneous Variables Via Adaptive Feature Normalization" [ArXiv]
Authors: Aakash Kaku, Sreyas Mohan*, Avinash Parnandi, Heidi Schambra, Carlos Fernandez-Granda*
Pre-print
7. "An artificial intelligence system for predicting the deterioration of COVID-19 patients in the emergency department" [ArXiv]
Authors: Farah E. Shamout, Yiqiu Shen*, Nan Wu*, Aakash Kaku*, Jungkyu Park*, Taro Makino*, Stanislaw Jastrzbski, Duo Wang, Ben Zhang, Siddhant Dogra, Meng Cao, Narges Razavian, David Kudlowitz, Lea Azour, William Moore, Yvonne W. Lui, Yindalon Aphinyanaphongs, Carlos Fernandez-Granda, Krzysztof J. Geras*
Nature npj Digital Medicine (2021)
8. "Scheduling loss functions for optimal training of segmentation models" [Extended Abstract]
Authors: Aakash Kaku, Chaitra Hegde*, Sohae Chung, Xiuyuan Wang, Yvonne Lui, Narges Razavian*
Accepted at **ISMRM ML Workshop** in Sept 2018
9. "Automatic Knee Segmentation using Diffusion Weighted MRI"
Authors: A. Duarte, C. Hegde*, A. Kaku*, S. Mohan*, J G. Raya*
Accepted at Medical Imaging Meets NeurIPS, **NeurIPS**, Vancouver (Canada) 2019

10. "DARTS: DenseUnet-based Automatic Rapid Tool for brain Segmentation" [ArXiv]
Authors: **Aakash Kaku***, Chaitra Hegde*, Jeffrey Huang, Sohae Chung, Xiuyuan Wang, Matthew Young, Alireza Radmanesh, Yvonne Lui, Narges Razavian
Pre-print

SCHOLASTIC ACHIEVEMENTS

- Recipient of **Moore-Sloan research grant** to conduct research on human activity recognition in stroke patient using IMU sensors and deep learning; Recipient of Travel Grant: NeurIPS 2019.
- **Dean's Merit List** Awardee for being in **top 5%** of IIMB graduating class of 2014-16; **Institute Rank 2** and **Section Topper** for term III (3.86/4)
- Awarded *Sir Ratan Tata* scholarship for standing among **Top 5** ranks of the class at ICT (Under Grad.)
- Felicitated by Mumbai Municipal Corp. with a scholarship for excellent performance (Top 2%) in Class XII Exams

PROFESSIONAL EXPERIENCE

Research Intern

- *NYU School of Medicine, New York* Feb 2018 – May 2019
Advisor: Prof. José Maria Raya Garcia Del Olmo, Prof. Narges Razavian
 - Performed highly imbalanced multi-class knee cartilage tissue segmentation using diffusion weighted MRIs. Developed and implemented an efficient variant of the 2d U-Net model with 40x fewer parameters and dilated convolutions. Proposed model achieved state-of-the-art results and surpassed a human radiologist level.
 - Performed perturbation analysis to understand important features of MRI for the segmentation task. Built confidence maps that showed the model's confidence for the voxel-level predictions. [github] [Project Report]
 - Designed and implemented a 102 class segmentation DenseUnet model to segment highly imbalanced brain MR dataset. Proposed a method to schedule (change) loss function while training to ensure better convergence of the model. [ArXiv] [github]

Strategy Analyst

- *Accenture Management Consulting Firm, Bangalore* May 2016 – Aug 2017
 - Built & implemented an NLP model to categorize the process activities as automated, semi- automated or manual; Automatic categorization helped in process optimization; Resulted in savings of \$3 Mn for the client.
 - Assisted two largest chemical companies in the world to undergo a successful merger by doing a thorough process due diligence; Received a letter of appreciation from the client (a Fortune 100 company) for excellent execution of the project.

TEACHING AND GRADING EXPERIENCE

Teaching Assistant

- *Mathematical Tools for Data Science* Spring 2021 for Prof. Carlos Fernandez Granda at NYU
- *Deep Learning for Medicine* Spring 2019 for Prof. Narges Razavian and Prof. Cem Deniz at NYU
- *Quantitative Methods 2* (Sept - Oct 2015) for Prof. Rajlaxmi Murthy at IIM Bangalore

Grader

- *Mathematical Tools for Data Science* Spring 2021 for Prof. Carlos Fernandez Granda at NYU
- *Predictive Modeling with Sports Data* Spring 2021 for Prof. Brett Bernstein and Prof. David F L at NYU
- *Probability and Statistics for Data Science* Fall 2020 for Prof. Carlos Fernandez Granda at NYU
- *Machine Learning* Spring 2019 for Prof. David Rosenberg and Prof. Julia Kempe at NYU

TECHNICAL SKILLS

- **Programming Languages:** Python, Excel VBA, Matlab, C++, C, R
- **Tools & Libraries:** Pytorch, keras, Pandas, nltk, Scikit-Learn, TensorFlow, OpenCV

CO CURRICULAR ACTIVITIES

- **Sports (Cricket)**
 - Core member of IIMB Cricket team; Gold and Silver Medalist in Inter-IIM Competition held in 2014 and 2015
- **Arts and Drama**
 - Senior Coordinator, Dramatics Club; Composed, Organized and Directed various street & stage plays in IIMB
 - Directed & performed Street Play for an audience of 400+ at the Independence day event, IIMB, 2015
 - Winner (out of 23 teams), Jaagruti, a street play competition, Theme of the play: Women Empowerment

SERVICE

Reviewer of NeurIPS 2019, American Journal of Neuroradiology, MLHC 2020, NeurIPS 2021, ICLR 2022.