# SILPA BABU

Ames, Iowa 50014, USA | +1-515-553-8183

silpababu17@gmail.com | https://www.linkedin.com/in/silpa-babu17/

## Objective

Ph.D. candidate in Electrical and Computer Engineering at Iowa State University with over one year of industry experience. Seeking an opportunity to apply my expertise in deep learning, inverse problems, and image processing.

## Research Interests

Deep Learning, Magnetic Resonance Imaging (MRI) Reconstruction, Inverse Problems, Signal Processing.

## Skills

- **Programming Languages**: Python, MATLAB.
- **Deep Learning Frameworks**: Pytorch, Tensorflow.

## Education

- **Iowa State University, Ames, Iowa** *Currently Pursuing*
  *Ph.D. in Electrical and Computer Engineering*
- **Vellore Institute of Technology, Vellore, India**
  *Master of Technology in Communication Engineering*
- **Kannur University, Kannur, India**
  *Bachelor of Technology in Electronics and Communication Engineering*

## Relevant Graduate level courses

Data Analytics in EE, Deep Learning, Machine learning, Digital Signal Processing, High Dimensional Probability, Theory Probability and Statistics, Linear Algebra, Convex Optimization.

## Experience

- **Graduate Research Assistant, Ames, Iowa** *Jan 2021 - Present*
  *Dept. of Electrical and Computer Engineering*
  Research Advisor: Dr. Namrata Vaswani, Anderlik Professor, Dept. of Electrical and Computer Engineering, Iowa State University.
  - Developed a 3-level hierarchical algorithm that is fast and memory-efficient for MRI reconstruction using undersampled k-space measurements.
  - Automated the code to ensure it works effectively across various MRI applications (brain, cardiac, and speech), sampling schemes (such as spiral, radial, Cartesian, and pseudo-radial), and sampling rates, without any parameter tuning.
  - Developed a near-real-time MRI reconstruction algorithm that outperforms traditional real-time methods and achieves image quality comparable to offline (non-real-time) reconstruction techniques.
  - Conducted a comparative study between the proposed algorithm and deep learning-based methods to evaluate reconstruction speed and generalizability across datasets.
- **Graduate Teaching Assistant, Ames, Iowa** *Jan 2021 - Dec 2022*
  *Dept. of Electrical and Computer Engineering | Signals and Systems, Probabilistic Methods for Electrical Engineers*
  Instructors: Dr. Namrata Vaswani, Dr. Andrew K. Bolstad
  - Mentored students in implementing MATLAB experiments for the Signals and Systems course.
  - Developed solution manuals for Probabilistic Methods for Electrical Engineers course.
- **Graduate Engineer | Intern, Bangalore, India** *Aug 2017 - Jan 2019*
  *Aptiv Technical Center*
  - Reduced CAN busload for efficient communication between radars.
  - Configured Bootloader for BMW SRR5 radar systems.

## PUBLICATIONS

C=CONFERENCE, J=JOURNAL

**[J.1]** **S. Babu**, S. G. Lingala, and N. Vaswani, "Few Shot Alternating GD and Minimization for Generalizable Real-Time MRI", *under review, IEEE Transactions on Computational Imaging*, 2025.

**[J.2]** **S. Babu**, S. G. Lingala and N. Vaswani, "Fast Low Rank Column-Wise Compressive Sensing for Accelerated Dynamic MRI", *IEEE Transactions on Computational Imaging*, 2023, vol.9, pp. 409-424, doi: 10.1109/TCI.2023.3263810.

**[C.1]** **S. Babu**, W. Alam, R. Z. Rusho, S. Goud Lingala and N. Vaswani, "Generalizable Real-time Accelerated Dynamic MRI", *2025 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Hyderabad, India, 2025, pp. 1-5, doi: 10.1109/ICASSP49660.2025.10888799.

**[C.2]** **S. Babu**, S. Aviyente and N. Vaswani, "Tensor Low Rank Column-Wise Compressive Sensing for Dynamic Imaging", *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023, pp. 1-5, doi: 10.1109/ICASSP49357.2023.10097054.

**[C.3]** **S. Babu** and N. Vaswani, "A Fast Algorithm for Low Rank + Sparse column-wise Compressive Sensing", *59th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, 2023, pp. 1-6, doi: 10.1109/Allerton58177.2023.10313478.

**[C.4]** **S. Babu**, S. S. Nayer, S. G. Lingala and N. Vaswani, "Fast Low Rank Column-Wise Compressive Sensing For Accelerated Dynamic MRI", *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2022, pp. 1346-1350, doi: 10.1109/ICASSP43922.2022.9747549.

**[C.5]** **S. Babu** and N. Vaswani, "AltGDmin for Accelerated L+S Dynamic MRI", 2024 58th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2024, pp. 265-269, doi: 10.1109/IEEECONF60004.2024.10942852.

**[C.6]** **S. Babu**, S. Goud Lingala and N. Vaswani, "Fully Generalizable Few Shot Alternating Gradient Descent and Minimization for Real-Time Dynamic MRI", ISMRM, Hawaii, USA, 2025.

## PRESENTATIONS

**[1]** **S. Babu**, S. Goud Lingala and N. Vaswani, "Generalizable Real-time Accelerated Dynamic MRI", Learn to Compress Compress to Learn Workshop at ISIT, Michigan, USA, 2025.

## CERTIFICATION

- **Deep Learning Specialization**
  *Coursera (Instructor: Andrew Ng, DeepLearning.AI)* Feb 2024
  - Completed the following five courses: Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter Tuning, Regularization, and Optimization, Structuring Machine Learning Projects, Convolutional Neural Networks, Sequence Models
  - Verified certificate: https://coursera.org/share/aec75bdf496dd4800d3e4ef1f07bb651.

## DEEP LEARNING-BASED COURSE PROJECTS

- **Impact Study of Undersampled MRI Reconstruction on Brain Tumor Detection | Python, PyTorch**
  - Conducted an initial study analyzing the effect of undersampled k-space reconstruction on brain tumor detection performance.
- **Plant Disease Classification from Images | Python, TensorFlow**
  - Designed and trained Convolutional Neural Networks (CNNs) for disease classification tasks using images. Improved classification accuracy through data augmentation and hyperparameter tuning.

## AWARDS

- Mrs. Sundarabai Thulasiraman Endowment Award for outstanding performance in the academic year 2017-2018.
- Merit Scholarship for the best academic performance in the academic years 2016-2017 and 2017-2018.
- Gold Medal for scoring the highest marks among 50 students during my Master's degree.

## VOLUNTEER EXPERIENCE

- **Outreach and Publicity Officer** *Iowa State University*
  *Graduate Student Organization (GO-ECPE)* Jan 2024 - May 2024
- **Tutor** *Iowa State University*
  *CyMath* Aug 2023 - Feb 2024