SATHSARA DIAS

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As an applied mathematician specializing in data-driven analysis, I bring expertise in model- and data-order reduction (Koopman/Dynamic Mode Decomposition, Proper Orthogonal Decomposition, etc.), time-series analysis, and statistical learning. I have developed a custom Dynamic Mode Decomposition (DMD) framework—an unsupervised learning approach—for extracting coherent structures and temporal dynamics from aerospace, oceanographic, and environmental datasets. I further extended this framework for real-time detection by integrating regression-based predictive models. I am seeking an industry role where I can leverage my experience in data-driven modeling, statistical learning, and predictive analytics to deliver scalable, production-ready solutions within Agile teams.

TECHNICAL SKILLS

- **Programming & Tools:** Python, MATLAB, SQL, R, Git, LaTeX, Power BI
- **Libraries & Frameworks:** NumPy, pandas, SciPy; Scikit-learn, XGBoost, LightGBM, CatBoost; TensorFlow, Keras; Matplotlib, Seaborn; OpenCV, Statsmodels, Prophet
- **Methods:** Supervised & Unsupervised Learning, Time-Series Forecasting, Deep Learning, Regression & Classification, Clustering, Dimensionality Reduction, Spectral Decomposition, Statistical Inference
- **Applied Expertise:** EDA, Feature Engineering & Selection, Custom DMD Development, Real-Time Detection Systems, Scientific Computing, SQL Integration, High-Performance Computing
- **Professional Attributes:**
  - Rapid learner with strong adaptability—able to master new tools and domains to meet evolving project needs
  - Collaborative team player—partnered with multidisciplinary research teams and industry experts during Ph.D. to accelerate innovation and deliver results

RESEARCH INTERESTS

- **Data-driven modeling and analysis of complex dynamical systems**
- **Computational fluid dynamics and flow analysis**
- **Machine learning, deep learning, and statistical methods**
- **Applications:** Aerospace Engineering; Oceanography & Environmental Sciences; Image Processing & Computer Vision; Bioinformatics & Neuroscience; Social & Behavioral Sciences; Food Systems & Supply Chain Analytics

EDUCATION

- **Ph.D. in Mathematics**, Clarkson University, Potsdam, NY, USA *August 2024*
  - Dissertation: Identifying the Onset of Buffet Boundaries Using Sliding-Window Dynamic Mode Decomposition—an **unsupervised machine learning** method; implemented MATLAB/Python pipelines leveraging DMD, PCA, POD/FFT on $\approx 8.14 \times 10^{10}$ CFD points for buffet onset prediction and real-time sensor dashboards.

- **M.Sc. in Mathematics**, Clarkson University, Potsdam, NY, USA *May 2020*
  - Thesis: Identifying Buffet Oscillations Using Sliding-Window Dynamic Mode Decomposition—an **unsupervised machine learning** approach; built MATLAB/Python pipelines, applied DMD, PCA, FFT/POD support, and developed reduced-order models for buffet forecasting.
- **M.Sc. in Industrial Mathematics**, Postgraduate Institute of Science, University of Peradeniya, Sri Lanka *December 2013*
  - Thesis: Rainfall forecasting with Artificial Neural Networks in MATLAB; built data pipelines, trained and tuned models, and validated via RMSE/MAE.
- **B.Sc. in Physical Science**, University of Colombo, Sri Lanka *February 2011*
  - Thesis: Media-Based Survey of Lightning Casualties in Sri Lanka (1958–2009); compiled archival records and applied statistical & geospatial methods to map risk patterns.

PROFESSIONAL EXPERIENCE

- **Senior Lecturer**, University of Sri Jayewardenepura, Gangodawila, LKA *Apr 2024–Present*
- **Graduate Teaching Assistant**, Clarkson University, Potsdam, NY, USA *Jan 2024–Aug 2024*
- **Graduate Research Assistant**, Clarkson University, Potsdam, NY, USA *Jan 2019–Dec 2023*
- **Graduate Teaching Assistant**, Clarkson University, Potsdam, NY, USA *Aug 2018–Dec 2018*
- **Lecturer in Astronomy**, Astronomy & Space Study Centre, Piliyandala, LKA *Jan 2005–May 2018*
- **Mathematics Teacher**, Mahinda Rajapaksha College, Homagama, LKA *Jan 2014–May 2018*

RESEARCH AND PUBLICATIONS

- **Identifying Buffet Oscillations Using Sliding-Window Dynamic Mode Decomposition**
  - Role: First author and project lead
  - Advisors: Dr. Marko Budišić; Dr. Pat Piperni; Dr. Brian T. Helenbrook
  - Publication: AIAA Journal (2024); https://arc.aiaa.org/doi/10.2514/1.J063929
  - Methods & Tools: MATLAB, Python (NumPy, pandas, Matplotlib, Seaborn, Scikit-learn, SciPy, Statsmodels), DMD, regression, time-series modeling on Acres HPC
- **Analysis of Tidal Flows Through the Strait of Gibraltar Using Dynamic Mode Decomposition**
  - Role: First author and project lead
  - Collaborators: Dr. Sudam Surasinghe; Dr. Kanaththa Priyankara; Dr. Marko Budišić; Dr. Larry Pratt; Dr. José C. Sanchez-Garrido; Dr. Erik M. Bollt
  - Publication: JPO (under review); https://arxiv.org/pdf/2311.01377
  - Methods & Tools: MATLAB, Python (NumPy, pandas, Matplotlib, Seaborn, Scikit-learn, SciPy, Statsmodels), DMD, oceanographic modeling, time-series analysis on Acres HPC
- **Identifying the Onset of Buffet Boundary Using Sliding-Window Dynamic Mode Decomposition**
  - Role: First author and project lead
  - Collaborators: Dr. Brian T. Helenbrook; Dr. Marko Budišić; Dr. Pat Piperni
  - Publication: Submission is planned for the *Journal of the American Institute of Aeronautics and Astronautics (AIAA)*. Link: [Confidential]
  - Contribution: Developed a data-driven buffet sensor for transonic airfoil onset detection
  - Methods & Tools: Python (NumPy, pandas, Matplotlib, Seaborn, Scikit-learn, SciPy, Statsmodels), DMD, regression, spectral decomposition

- **Rainfall Forecasting Using Artificial Neural Networks**
  - Duration: M.Sc. Thesis (2012–2013)
  - Advisor: Dr. P. Ekanayake, University of Peradeniya
  - Methods & Tools: MATLAB, ANN, data ingestion & feature pipelines, cross-validation, hyperparameter tuning, RMSE/MAE
- **Long-Term Variation of Lightning Casualties in Sri Lanka (1958–2009)**
  - Advisor: Dr. Chandana Jayaratne, University of Colombo
  - Publication: SAARC STORM Seminar, Colombo (2013)
  - Methods & Tools: Statistical trend analysis, archival data mining, Excel, R, geospatial mapping

TALKS AND POSTER PRESENTATIONS

- **Oral Presentation**, NERCCS 2024: Seventh Northeast Regional Conference on Complex Systems, Clarkson University, Potsdam, NY, USA *Mar 2024*
- **Poster Presentation**, SIAM Conference on Applications of Dynamical Systems (DS23), USA *May 2023*
- **Oral Presentation**, MCCNNY: Mathematics Conference and Competition of Northern New York, Clarkson University, Potsdam, NY, USA *Mar 2022*
- **Oral Presentation**, SIAM Conference on Applications of Dynamical Systems (DS21), USA *May 2021*
- **Conference Talk**, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Session K06:6: Nonlinear Dynamics, USA *Nov 2020*
- **Poster Presentation**, GAMM Juniors' Summer School on Applied Mathematics and Mechanics (SAMM), USA *Jul 2020*
- **Poster Presentation**, 4th Annual Spring Research and Project Showcase (RAPS), Clarkson University, Potsdam, NY, USA *Apr 2020*
- **Poster Presentation**, MCCNNY: 4th Mathematics Conference and Competition of Northern New York, Clarkson University, Potsdam, NY, USA *Feb 2020*
- **Poster Presentation**, Dynamics Days 2020: Chaos and Nonlinear Dynamics, Hilton, Hartford, CT, USA *Jan 2020*
- **Participant**, IPAM Workshop on Operator Theoretic Methods in Dynamic Data Analysis and Control, UCLA, Los Angeles, CA *Feb 2019*
- **Poster Presentation**, 3rd Annual Summer Research and Project Showcase (RAPS), Clarkson University, Potsdam, NY, USA *Apr 2019*

AWARDS AND HONORS

- **Best Oral Presentation Award** — MCCNNY *2022*
- **SIAM Student Travel Award** — Society for Industrial and Applied Mathematics *2021*
- **Audience Choice, Best Graduate Poster** — RAPS *2020*
- **Best Poster Presentation Award** — MCCNNY *2020*
- **IPAM Student Travel Award** — UCLA IPAM Workshop *2019*
- **Inaugural Clarkson Ignite Fellow** *2019–2023*

CERTIFICATIONS AND TRAINING

- **SCJP:** Sun Certified Programmer for the Java 2 Platform, Standard Edition 5.0
- **SCWCD:** Sun Certified Web Component Developer for the Java EE Platform
- **GTA Boot Camp:** Summer School for Teaching, SIGTA, Clarkson University, Potsdam, NY, USA (Undergraduate STEM courses)

LEADERSHIP AND ACADEMIC SOCIETIES

- **Active Memberships**
  - Society for Industrial and Applied Mathematics (SIAM)
  - American Physical Society (APS)
- **Astronomy & Space Study Center (ASSC)**
  - Roles: Vice President (2002–2003), President (2004–2005)
  - Key Contributions: Led Astronomy Summer School, Night Observation Camps, and Telescope Building Workshop; orchestrated weekly mathematics and physics sessions to boost community engagement.
- **Mathematical and Astronomical Society, University of Colombo**
  - Role: Vice President (2006–2008)
  - Key Contributions: Organized All-Island Inter-School Astronomy Quiz Competition; served as judge for national academic competitions.
- **Epsilon Delta Society, University of Colombo**
  - Role: Committee Member (2005–2008)
  - Key Contributions: Celebrated the beauty of mathematics through events and workshops, fostering appreciation among the university community.

REFERENCES

Dr. Marko Budišić
Contact: +1 (315) 268-3742 | `mbudisic@gmail.com`
Position: Assistant Professor, Department of Mathematics,
Clarkson University, Potsdam, NY 13699-5815, USA

Dr. Brian T. Helenbrook
Contact: +1 (315) 268-2204 | `bhelenbr@clarkson.edu`
Position: Professor and Chair of Mechanical and Aerospace Engineering,
Paynter-Krigman Endowed Professor in Engineering Science Simulation,
Clarkson University, Potsdam, NY 13699-5815, USA

Dr. Pat Piperni
Contact: +1 (315) 268-7620 | `ppiperni@clarkson.edu`
Position: Associate Professor, Department of Mechanical and Aerospace Engineering,
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Dr. Don Kumudu Mallawa Arachchi
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Position: Lecturer, Department of Mathematics,
Iowa State University of Science and Technology,
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