Shameer **Sathar**

Research Fellow

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Expertise

C++, Python, machine-learning/deep-learning techniques, data analysis, numerical-methods, high-performance computing, signal processing

Education

University of Auckland — *Auckland, New Zealand*
Ph.D | Bioengineering — *Dec. 2011 - Dec. 2015*

- **Thesis**: "High-performance computational simulations of gastrointestinal electrical activity"
- Developed a C++ based computational framework to model gastrointestinal electrical activity.
- Analysed and interpreted experimental and simulated electrical activities.
- Published 2 first-authored and 4 co-authored publications in high-quality journals.
- Honored with **University of Auckland Research Excellence Award** as part of the Gastrointestinal Research Group in 2016.

University of Oxford — *UK*
Visiting Student — *Aug. 2014 - Sep. 2014*

- Developed and contributed codes for CHASTE computational framework and investigated preconditioners for system of equations arising in gastric electrophysiology.

Cochin University of Science and Technology (CUSAT) — *Kochi, India*
B.Tech. | Faculty of Engineering | Electronics and Communication Engineering — *May. 2006 - Apr. 2010*

- **Thesis**: "Reconfigurable Integer/Floating-Point Arithmetic Logic Unit"
- Accoladed with Distinction and ranked amongst top 3 students.

Experience

Gastrointestinal Systems Group (Manager: Dr. Leo K. Cheng), Auckland Bioengineering Institute — *Auckland, New Zealand*
Research Fellow — *Dec. 2015 - present*

- Researching means of retrieving clinically relevant events and key-marker patterns using Convolutional Neural Network (Lasagne/Theano).
- Designed and implemented a signal event detection package using Python + SciKit-Learn (SVM) + PyQTGraph. The package is able to detect the events with 91% sensitivity and 92% specificity. The results were selected for presentation at the prestigious Virtual Physiological Human (VPH) 2016 conference.
- Optimized the scalability and performance of complex data processing/analysis pipelines using NZ computing cluster NeSI.

Systems Biology Group (Manager: Dr. Mike Cooling), Auckland Bioengineering Institute — *Auckland, New Zealand*
RESEARCH DEVELOPER — *Aug. 2015 - Nov. 2015*

- Developed a mathematical framework in C++ to fit model parameters to experimental values using Genetic Algorithm.
- Optimized the scalability and performance of complex data processing/analysis pipelines utilizing the large NeSI (New Zealand eScience Infrastructure) grid computing cluster.

Uniservices — *Auckland, New Zealand*
RESEARCH ASSISTANT — *Aug. 2013 - Sep. 2013*

- Developed a predictive mathematical model for defining the diffusive properties of stimulus current in esophagus tissue.

NeST Technologies Corp. — *Trivandrum, India*
SOFTWARE ENGINEER — *Sep. 2010 - Oct. 2011*

- Developed codes in C++ to implement back-end algorithm to store DICOM images for medical imaging equipment vendors.
- Developed basic to complex SQL queries to be executed in an automated fashion on user request.

Technical Skills

Programming	Python, C/C++
Statistical Tools	numpy, pandas, Matlab, R
Machine Learning Tools	Lasagne/theano, scikit-learn, WEKA
Version Control	git, subversion
Parallel Computing	C++ MPI, SLURM, NeSI Computing Cluster
OS	Linux, Windows

Honors & Awards

2017	**ABI Performance-based Research Funding Award**, University of Auckland	*New Zealand*
2016	**ABI Performance-based Research Funding Award**, University of Auckland	*New Zealand*
2016	**Research Excellence Award**, University of Auckland	*New Zealand*
2015	**Maurice and Phyllis Paykel Trust**, Travel Award	*New Zealand*
2013	**Young Investigator Award** , 15th International Conf. on Biomedical Engineering	*Singapore*
2013	**Maurice and Phyllis Paykel Trust**, Travel Award	*New Zealand*

Journal Publications

1. Angeli, T. R., Du, P., Paskaranandavadivel, N., **Sathar, S.**, Hall, A., Asirvatham, S. J., . . . O'Grady, G. (2016). High-resolution electrical mapping of porcine gastric slow-wave propagation from the mucosal surface. Neurogastroenterology & Motility.
2. Angeli, T. R., Du, P., Midgley, D., Paskaranandavadivel, N., **Sathar, S.**, Lahr, C., . . . O'Grady, G. (2016). Acute Slow Wave Responses to High-Frequency Gastric Electrical Stimulation in Patients With Gastro-

paresis Defined by High-Resolution Mapping.. Neuromodulation : Journal of the International Neuromodulation Society.

3. **Sathar, S.**, Trew, M. L., OGrady, G., & Cheng, L. K. (2015). A Multiscale Tridomain Model for Simulating Bioelectric Gastric Pacing. IEEE transactions on bio-medical engineering, 62(11), 2685-2692.
4. Paskaranandavadivel, N., Wang, R., **Sathar, S.**, O'Grady, G., Cheng, L. K., & Farajidavar, A. (2015). Multichannel wireless mapping of gastrointestinal serosal slow wave propagation.. Neurogastroenterology and motility : the official journal of the European Gastrointestinal Motility Society, 27(4), 580-585.
5. Gao, J., **Sathar, S.**, O'Grady, G., Archer, R., & Cheng, L. K. (2015). A Stochastic Algorithm for Generating Realistic Virtual Interstitial Cell of Cajal Networks. IEEE transactions on bio-medical engineering, 62(8), 2070-2078.
6. Gao, J., **Sathar, S.**, O'Grady, G., Han, J., & Cheng, L. K. (2014). Developmental Changes in Postnatal Murine Intestinal Interstitial Cell of Cajal Network Structure and Function. Annals of biomedical engineering, 42(8), 1729-1739.
7. **Sathar, S.**, Trew, M. L., Du, P., O'Grady, G., & Cheng, L. K. (2014). A biophysically based finite-state machine model for analyzing gastric experimental entrainment and pacing recordings. Annals of biomedical engineering, 42(4), 858-870.
8. Du, P., O Grady, G., Gao, J., **Sathar, S.**, & Cheng, L. K. (2013). Toward the virtual stomach: progress in multiscale modeling of gastric electrophysiology and motility. Wiley Interdisciplinary Reviews: Systems Biology and Medicine, 5(4), 481-493.

Conference Proceedings

1. Krohn. B, **Sathar, S.**, Rohrle, O, Vanderwinden, J., O'Grady, G. , & Cheng, L. K (2017). A Framework for Simulating Gastric Electrical Propagation in Confocal Microscopy Derived Geometries. In 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (*in press*).
2. Alighaleh. S, Angeli, TA., **Sathar. S**, O'Grady, G., Cheng, L. K and Paskaranandavadivel. N (2017). Design and Application of a Novel Gastric Pacemaker. In 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (*in press*).
3. **Sathar, S.**, Trew, M. L., & Cheng, L. K. (2015). Tissue Specific Simulations of Interstitial Cells of Cajal Networks Using Unstructured Meshes. In 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (pp. 8062-8065). Milan, ITALY
4. **Sathar, S.**, Cheng, L. K., & Trew, M. L. (2015). A Comparison of Solver Performance for Complex Gastric Electrophysiology Models. In 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (pp. 1452-1455). Milan, ITALY: IEEE.
5. **Sathar, S.**, O'Grady, G., Trew, M. L., & Cheng, L. K. (2014). A Biophysically-Based Tissue Model for Optimizing Gastric Pacing. In The 15th International Conference on Biomedical Engineering (pp. 52-55).
6. **Sathar, S.**, Trew, M. L., & Cheng, L. K. (2014). The role of the ICC myenteric plexus network in the anisotropic propagation of intestinal slow wave activity. In Acta Physiologica Vol. 211 (pp. 115-116). Budapest, Hungary.

References

**Available on request*