

# KISHOR PATIL

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Department of Telecommunications and Information Processing, Ghent University, St-Pietersnieuwstraat 41, 9000

## RESEARCH INTERESTS

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Stochastic Modelling, Queueing theory, Wireless sensor networks, Markov Decision Process, Mean field limits

## EDUCATION

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<b>Ph.D.</b> , Telecommunications and Information Processing, Ghent University	Dec. 2015 - Present
<b>M.Tech.</b> , Industrial Engineering and Operations Research, IIT Bombay (GPA: 9.16/10)	Jul. 2012 - Jun. 2014
<b>B.Tech.</b> , Electronics and Telecommunication, SGGSIET Nanded (GPA: 8.43/10)	Jul. 2008 - Jun. 2012

## RESEARCH EXPERIENCE

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### Ph.D. Research

Ghent University, Advisor: Prof. D. Fiems

Dec. 2015 - Present

- Developed a two queue stochastic model for energy harvesting wireless sensor node with Markov decision framework and analysed the impact of value of information on transmission policy of the node
- Developed a stochastic model where energy harvesting process is modelled using N-state Markov modulated process and data sensing process is time correlated. The performance analysis of the model can be used for optimal design of the wireless sensor networks (WSNs)
- Proposed a numerically tractable stochastic model for the performance evaluation of underwater wireless sensor network which can be used for optimisation purposes as it requires limited computational efforts
- Working on large-scale energy harvesting WSNs where number of sensor nodes interact with each other using scaling techniques like heavy-traffic limits, fluid and diffusion limits, and mean field approximations

### Visiting Research Fellow

Laboratoire des Signaux et Systèmes, CentraleSupélec, Supervisor: Prof. K. De Turck

Sep. 2018 - Nov. 2018

- Developed a stochastic model for large scale sensor networks relying on large-scale techniques including a mean field approach, fluid and diffusion limits ignoring the energy harvesting dynamics
- Investigated how well these models could capture the performance of the sensor networks by comparing numerical experiments with the model, and pure simulation experiments
- Obtained some interesting theoretical proprieties of the optimal transmission policies which are easy to implement in practise such as bang-bang nature and threshold structure

### Firm User-set Interactions in the Context of Admission Control Queues

Master Thesis, IIT Bombay Advisor: Prof. N. Hemachandra

May. 2013 - Jun. 2014

- Developed a model for admission control system as a firm-market interaction and analysed its equilibrium point for both average and discounted reward using parameterised Markov Decision Process (MDP)
- Explored the model for different non-exponential arrival distributions and obtained interesting theoretical properties on monotonicity of QoS and existence of finite control limit

## PROFESSIONAL EXPERIENCE

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**HSBC Data Processing Centre** Bangalore Analyst - Business Consulting

Jul. 2014 - Oct. 2015

### Correspondent Banking - Financial Crime Compliance/ Risk Compliance

- Worked as an Individual Contributor during the entire project for model development, Deployment, validation and tuning with multiple regions such as UK and HK
- Developed model for correspondent banking to detect suspicious activities resulting in money laundering using techniques like linear regression, forecasting, Above the Line (ATL) and Below the Line (BTL) testing
- Implemented complete model in SQL/SAS and automated the whole model to speed up the process

### Global Investigation Analytics

- Built a Global Investigation Analytics function to support ATL testing and BTL validation for existing transaction monitoring scenarios (TMS)
- Introduced standardised, efficient and scalable event triage system which scores all events generated by any TMS based on a balanced risk tiered Model

## TEACHING EXPERIENCE

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### Ghent University

Teaching Assistant, Department of TELIN, Ghent University

- **C003399** Computer Intensive Simulation Methods Spring 2018

### IIT Bombay

Teaching Assistant, Department of IEOR, IIT Bombay

- **IE 616** Decision Analysis and Game Theory Spring 2014
- **IE 605** Engineering Statistics Autumn 2013

## SELECTED CONFERENCE TALKS

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- **K. Patil**, M. Jafri, D. Fiems and A. Marin StochMod 2018  
Performance Evaluation of Depth Based Routing in Underwater Sensor Networks
- **K. Patil**, and K. De Turck, Koen and D. Fiems ECQT 2018  
Optimal control in wireless sensor networks: a mean-field approach
- **K. Patil**, and K. De Turck, Koen and D. Fiems ASMTA 2016  
Optimal data collection in hybrid energy-harvesting sensor networks

## JOURNAL PUBLICATIONS

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- **K. Patil**, K. De Turck, and D. Fiems. Optimal data collection in wireless sensor networks with correlated energy harvesting. *Annals of Telecommunication* 1958-9395 : 1-12, 2018.
- **K. Patil**, and D. Fiems. The value of information in energy harvesting sensor networks. *Operations Research Letters* 46 (3) : 362-366, 2018.
- **K. Patil**, K. De Turck, Koen and D. Fiems. A two-queue model for optimising the value of information in energy-harvesting sensor networks. *Performance Evaluation* 0166-5316 (119) : 27-42, 2017.

## SKILL SET

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<b>Programming Languages</b>	Python, C, SQL, AMPL, R
<b>Computational/ Utility tools</b>	MATLAB, Mathematica, L <sup>A</sup> T <sub>E</sub> X
<b>Statistical Tools</b>	R, SAS
<b>Platforms</b>	Mac OS (X), Linux (Ubuntu)

## RELEVANT WORKSHOP AND COURSEWORK

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### Workshops

- Summer school on Numerical methods for stochastic models: mean-field, CIRM, Marseille summer 2017
- Workshop on Introduction to High performance Computing, Ghent University Spring 2017
- Workshop on Mathematica, Ghent university Autumn 2016

### Selected Coursework

- E014230 - Stochastic Processes Autumn 2017
- E012320 - Mobile and Broadband Access Networks Autumn 2017
- IE 708 - Markov Decision Processes Spring 2013
- IE 611 - Introduction to Stochastic Models Autumn 2012

## EXTRACURRICULAR ACTIVITIES

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- Jury member of master thesis committee; Thesis entitled “The P2Pool mining pool - An analysis of a distributed cryptographically secured database” Oct. 2017
- Volunteering at master thesis fair at Ghent university to give the information on department’s research domains so that students can choose their thesis topic Feb. 2017
- Student Companion for the IEOR department, helping new entrants in various academic and non- academic issues Jul. 2013 - Jun. 2014