

# BALAGOPAL G. MENON

Assistant Professor  
Department of Industrial and Systems Engineering  
Indian Institute of Technology Kharagpur  
Kharagpur, West Bengal, India.

## PERSONAL DATA

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Pavana - Puthezhath,  
Palluruthy, Cochin – 682006,  
Ernakulam, Kerala, India.

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bgmenon@iem.iitkgp.ac.in

## EDUCATION

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Aug - Jan 2018	<b>Post-Doctoral Research Fellow</b> Energy Institute, The University of Texas at Austin, USA. Host: Dr. Carey W. King
Jun - Mar 2017	<b>Visiting Research Fellow</b> Salford Business School, University of Salford, Manchester, United Kingdom. Host: Dr. Sunil Sahadev
2007-2013	<b>Doctor of Philosophy</b> in Industrial Engineering and Management Department of Industrial and Systems Engineering, Indian Institute of Technology Kharagpur (IIT KGP), West Bengal, India. Thesis: <i>Modeling the Effects of Energy Efficiency Improvements in Personal Transport Sector in India.</i> Advisor: Dr. Biswajit Mahanty
2004-2006	<b>Master of Technology</b> in Engineering Statistics Department of Statistics, Cochin University of Science and Technology, Kerala, India. Dissertation: <i>Optimization of Belt Filter Parameters in a Zinc Filtering Unit.</i> Advisor: Dr. K. C. James <i>Class:</i> First class distinction with second rank.
2000-2004	<b>Bachelor of Technology</b> in Production Engineering Department of Production cum Plant Engineering, Government Engineering College, Thrissur, University of Calicut, Kerala, India. Report: <i>Comparison of Corrosion Resistance of Titanium, Nickel, Stainless Steel 304 and Stainless Steel 316 in Chlorinated Brine in a Chlorine Production Unit.</i> Advisor: Prof. Vidyasagar <i>Class:</i> First class.

- 1997 - 1999 | **Indian School Certificate Examination (Year-12)**  
Council for the Indian School Certificate Examinations, New Delhi  
St. Aloysius Convent ICSE School, Kerala, India.  
*Class:* First class.
- 1997 | **Indian Certificate of Secondary Education (Year-10)**  
Council for the Indian School Certificate Examinations, New Delhi  
St. Aloysius Convent ICSE School, Kerala, India.  
*Class:* First class.

## WORK EXPERIENCE

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- Present - Jun 2019 | **Assistant Professor Grade-I**  
Department of Industrial and Systems Engineering,  
Indian Institute of Technology Kharagpur,  
Kharagpur, West Bengal, India.
- May 2019 - Oct 2018 | **Associate Professor**  
Department of Mechanical Engineering,  
SCMS School of Engineering and Technology,  
Karukutty, Ernakulam, Kerala, India.
- Aug - Jan 2018 | **Post-Doctoral Research Fellow**  
Energy Institute,  
The University of Texas at Austin, USA.
- Sep - Jul 2017 | **Associate Professor**  
Department of Mechanical Engineering,  
SCMS School of Engineering and Technology,  
Karukutty, Ernakulam, Kerala, India.
- Jun - Mar 2017 | **Visiting Research Fellow**  
Salford Business School,  
University of Salford, Manchester, United Kingdom.
- Feb 2017 - Aug 2013 | **Associate Professor**  
Department of Mechanical Engineering,  
SCMS School of Engineering and Technology,  
Karukutty, Ernakulam, Kerala, India.
- Jul 2013 - Nov 2012 | **Assistant Professor**  
Department of Mechanical Engineering,  
SCMS School of Engineering and Technology,  
Karukutty, Ernakulam, Kerala, India.
- Nov 2012 - Jul 2007 | **Research Scholar**  
Department of Industrial and Systems Engineering,  
Indian Institute of Technology Kharagpur, West Bengal, India.
- Jun 2007 - Dec 2005 | **Senior Lecturer**  
Department of Mechanical Engineering,  
SCMS School of Engineering and Technology,  
Karukutty, Ernakulam, Kerala, India.

Sep - Jul 2005	<b>Guest Lecturer</b> Department of Physics, Government Maharajas College, Ernakulam, Kerala, India.
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## RESEARCH INTERESTS

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Operations Management, System Dynamics and Policy Planning, Quality Engineering, Energy Systems Modeling and Management, Biophysical Resources - Economy Interaction Dynamics, Applied Multivariate Statistics, Econometric Modeling of Systems, Statistical Design and Analysis of Experiments.

I am having expertise and capabilities for research and teaching in the areas mentioned above.

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## RESEARCH COLLABORATIONS

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1. I was a Post-Doctoral Research Fellow in Energy Institute, The University of Texas at Austin, USA. I was under the supervision of Dr. Carey W. King, Assistant Director, Energy Institute; Lecturer, Red McCombs School of Business; and Research Scientist, Jackson School of Geosciences, The University of Texas at Austin, USA. The research involves combining of the biophysical human and nature dynamic systems model with the macroeconomic monetary model in a system dynamics framework.
2. I was a consultant to Dr. Shalini M Nair and Dr. S Gokuldas of the Department of Anaesthesiology and Critical Care Medicine of Amrita Institute of Medical Sciences and Research Centre, Kerala. We were in to assessing and comparing the performance efficiency of three anaesthesia devices used in airway management based on its performance characteristics utilizing multivariate statistical techniques.
3. In March to June 2017, I was a Visiting Research Fellow to Salford Business School, University of Salford, Manchester, U.K. I have collaborated with Professor Sunil Sahadev, Salford Business School, Manchester, U.K., and Professor Biswajit Mahanty, Professor of the Department of Industrial and Systems Engineering, Indian Institute of Technology Kharagpur. I was involved in research in natural sustainability utilizing system dynamics.
4. In 2011-2013, I have collaborated with Professor G Madhu of the Department of Safety and Fire Engineering, Cochin University of Science and Technology, and was involved in research based on the application of system dynamics and applied statistics in safety engineering.

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## MY ACADEMIC LINEAGE

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I obtained my doctoral degree from IIT Kharagpur under the guidance of the eminent systems researcher Professor Biswajit Mahanty who was a doctoral student of Professor P.K.J. Mohapatra who popularized and pioneered the subject of System Dynamics in India. Professor P.K.J. Mohapatra was a Common Wealth Post-Doctoral Fellow under the guidance of Professor R.G. Coyle who was one of the founding fathers of the field System Dynamics.

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## AWARDS RECEIVED

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1. Research funding of 50,000 USD for carrying out research in energy modeling from The University of Texas at Austin, USA in 2017.
2. Selected for Post-Doctoral Fellowship under the supervision of Dr. Patrick Pouchet in University of Montpellier, France.
3. Selected for Post-Doctoral Fellowship under the supervision of Dr. Shiyong Liu in Southwestern University of Finance and Economics, China.

4. Doctoral students guideship in both streams of Engineering, and Management under APJ Abdul Kalam Technological University, Kerala, India in 2016.
5. India Government grant for attending the 30<sup>th</sup> International Conference of the System Dynamics Society at University of St. Gallen, Switzerland in 2012.
6. Government of India scholarship for doing doctoral research in IIT Kharagpur in 2007.

## **EDITORIAL BOARD MEMBERSHIP**

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1. Editorial Board Member, Energy Efficiency Journal, Springer.

## **SOFTWARE PROFICIENCY**

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1. *Statistical software*: SPSS, Minitab, Matlab, Statistica.
2. *Application software*: Stella, Vensim, R-Studio, L<sup>A</sup>T<sub>E</sub>X.

## **INVITED LECTURES**

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1. As a resource person on the topic ‘Scientific Misconducts’ for the Research and Publication Ethics invited lecture series conducted by Prof. N R Madhava Menon Interdisciplinary Centre for Research Ethics & Protocols, Cochin University of Science and Technology, Kerala, India.

## **WORKSHOP CONDUCTED IN IIT KGP**

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1. Conducted one week AICTE-QIP sponsored workshop on the topic ‘Application of Forecasting Methods in Engineering and Business Problems’ for faculty, researchers and master’s students in the Department of Industrial and Systems Engineering, IIT Kharagpur on 6-12 December 2020.
2. Taught applied statistics topic of ‘Logistic Regression’ as a resource person for the workshop on ‘Data Analytics with R’ conducted by the Department of Industrial and Systems Engineering, IIT Kharagpur on 20-22 November 2019.

## **WORKSHOP CONDUCTED OUTSIDE IIT KGP**

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1. As a resource person for a two hour webinar on the topic ‘Data Analytics’ conducted by Adi Shankara Institute of Engineering and Technology, Kerala, India on 13<sup>th</sup> July, 2020 with 90 participants.
2. As a resource person for a two hour webinar on the topic ‘Data Analytics’ conducted by St. Paul’s College, Cochin, Kerala, India on 14<sup>th</sup> May, 2020 with 90 participants.
3. As a resource person for a two hour webinar on the topic ‘Data Analytics’ conducted by SCMS School of Engineering and Technology, Kerala, India on 9<sup>th</sup> May, 2020 with 130 participants.
4. Conducted one day workshop on the topic ‘Research Methodology: Foundations of System Modelling and Data Analysis’ for faculty, researchers and master’s students in collaboration with the Department of Statistics, Cochin University of Science and Technology, Cochin on 18<sup>th</sup> February, 2020 and was the resource person on the topics Research Methodology and Statistical Design of Experiments.
5. Conducted one day workshop on the topic ‘Simulation’ for faculty, researchers and master’s students in collaboration with the Department of Statistics, Cochin University of Science and Technology, Cochin on 30<sup>th</sup> January, 2019 and was the resource person on the topic Continuous Simulation.

## TEACHING EXPERIENCE IN IIT KHARAGPUR

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Taught applied statistics to M.Tech students as a part of winter break classes of 2008 and was responsible for preparing the course material and question papers.

## TEACHING ASSISTANT IN IIT KHARAGPUR

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|----------------------------------------|-------------------------|
| 1. System Dynamics and Policy Planning | Autumn 2008, 2009, 2010 |
| 2. Decision Modeling - I               | Autumn 2011             |
| 3. Metaheuristics                      | Spring 2011             |

## LAB WORK EXPERIENCE IN IIT KHARAGPUR

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1. System Science and Information Systems lab
2. Gaming and Simulation lab
3. Applied Statistics lab
4. Quality Design and Control lab
5. Work System Design lab

## REFEREED JOURNAL ARTICLES

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1. Maiti, R., Menon, B.G. and Abraham, A. (2024), "Ensemble empirical mode decomposition based deep learning models for forecasting river flow time series", *Expert Systems with Applications*, Impact factor: 7.5, Accepted/In-Press.
2. Sourabh, S., Menon, B.G. and Mahanty, B. (2024), "Econometric Analysis of Circular Economy Co-flow Process in Metal Industry", *Quality & Quantity*, Vol.58, pp. 1583-1602.
3. Sourabh, S., Pavithran, S., Menon, B.G. and Mahanty, B. (2023), "Econometric modeling for the influence of economic variables on secondary copper production in India", *Resources Policy*, Vol.86 (Part B), pp. 1-9, Impact factor: 10.2.
4. Menon, B.G., Sahadev, S., Mahanty, A., Praveensal, C.J. and Asha, G. (2023), "Trivariate Causality Between Economic Growth, Energy Consumption and Carbon Emissions: Empirical Evidence from India", *Energy Efficiency*, Vol.16, No.41, pp. 1-21, Impact factor: 3.2, SCI Indexed.
5. Ghatak, S.K., Menon, B.G. and Mahanty, B. (2020), "Identifying, prioritizing and ranking of factors influencing the PhD milestones' completion delays", *Quality & Quantity*, Vol.55, pp. 1457-1476, Impact factor: 1.072, ABDC Rating: B, SCI Indexed.
6. Menon, B.G., Ghatak, S., Mahanty, B. and Sahadev, S. (2018), "Modeling doctoral population growth in premier technology institutions in India", *Systems Research and Behavioral Science*, Vol.35, pp. 738-745, Impact factor: 2.7, ABDC Rating: A, SSCI and ABS Indexed.
7. Menon, B.G. (2017), "Empirical evidence of direct rebound effect in Indian two-wheeler sector", *Energy Efficiency*, Vol.10, pp. 1201-1213, Impact factor: 3.2, SCI and SSCI Indexed.
8. Menon, B.G. and Mahanty, B. (2016), "Modeling Indian commuters' travel behavior concerning fuel efficiency improvement policy", *Travel Behaviour and Society*, Vol.4, pp. 11-21, Impact factor: 5.2, ABDC Rating: B, and ESCI Indexed.
9. Menon, B.G. and Mahanty, B. (2015), "Assessing the effectiveness of alternative policies in conjunction with energy efficiency improvement policy in India", *Environmental Modeling and Assessment*, Vol.20, Issue 6, pp. 609-624, Impact factor: 2.4, SCI Indexed.

10. Menon, B.G., Praveensal, C.J. and Madhu, G. (2015), "Determinants of job stress in Indian chemical process industry: A factor analysis approach", *WORK: A Journal of Prevention, Assessment and Rehabilitation*, Vol.52, pp. 855-864, Impact factor: 2.3, SSCI Indexed.
11. Menon, B.G. and Mahanty, B. (2012), "Effects of fuel efficiency improvements in personal transportation: Case of four-wheelers in India", *International Journal of Energy Sector Management*, Vol.6, pp. 397-416, Impact factor: 3.1, ESCI and Scopus Indexed.

## ARCHIVE ARTICLES

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1. Sahadev, S., Menon, B.G., Mohandass, T., Mahanty, B. and Ghatak, S.K. (2024), "Modelling banking IT service disruptions and customer switching behaviour", *Social Science Research Network (SSRN)*.

## BOOK CHAPTER

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1. Maiti, R. and Menon, B.G. (2023), "Predicting Injury Severity in Construction Using Logistic Regression", In *Data Management, Analytics and Innovation*, Springer, 175-185.

## REFEREED CONFERENCE PROCEEDINGS

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1. Mondal, K. and Menon, B.G. (2024), "Modeling the Growth of Unorganized Pharmaceutical Retail Sector: A Critical Review Based on Indian Pharmaceutical Industry", *2024 INFORMS Annual Meeting*, Seattle, Washington, USA.
2. Sourabh, S., Menon, B.G. and Mahanty, B. (2023), "Is circular economy process beneficial: A review based on Indian copper metal industry", *The 50<sup>th</sup> International Conference on Computers and Industrial Engineering*, Sharjah, UAE.
3. Menon, B.G., Mahanty, B., Sahadev, S., Praveensal, C.J. and Rakesh, A. (2019), "Modeling the trajectories of resilience and collapse of renewable marine resource", *37<sup>th</sup> International Conference of the System Dynamics Society*, Albuquerque, New Mexico, USA.
4. King, C.W. and Menon, B.G. (2018), "A long-term growth model with endogenous biophysical and economic states", *36<sup>th</sup> USAEE/IAEE North American Conference on Evolving Energy Realities: Adapting to What's Next*, United States Association for Energy Economics, Washington DC, USA.
5. Menon, B.G., Praveensal, C.J. and Madhu, G. (2014), "Modeling the influence of job stress on musculoskeletal disorders in process industries in India", *32<sup>nd</sup> International Conference of the System Dynamics Society*, Delft, Netherlands.
6. Menon, B.G., Mahanty, B. and Rama Rao, D. (2012), "Assessment of technical manpower requirements in agriculture sector in India", *30<sup>th</sup> International Conference of the System Dynamics Society*, St. Gallen, Switzerland.

## PRESENT RESEARCH ACTIVITIES

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1. Forecasting of natural gas demand in India in a biophysical - economic states interaction framework utilizing system sciences, system dynamics and applied econometrics to understand the future prospects of the natural gas industry in India.

## CURRENT PROJECTS AT IIT KHARAGPUR

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1. Modeling the growth of Indian natural gas industry, ISIRD, SRIC, IIT Kharagpur.
2. AI and Virtual Reality Modelling and Collaborative Learning of Risk and Situational Awareness in the Socio-Technical System Under Disruptions, Science and Engineering Research Board (SERB).

## **COMPLETED PROJECTS AT IIT KHARAGPUR**

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1. Evaluation of Human Factors and Safety in Submersible Platform for Acoustic Characterisation and Evaluation, Naval Physical and Oceanographic Laboratory, DRDO.

## **PARTICIPATION IN PROJECTS AT IIT KHARAGPUR**

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I was part of an India government funded project on “Technical Manpower Planning in Agriculture Sector in India”. The project lead investigator was Professor Biswajit Mahanty of Department of Industrial and Systems Engineering, IIT Kharagpur and was completed in 2012.

## **INDUSTRY-INSTITUTE INTERACTIONS**

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1. Engaged a three hour lecture on the topic “Quality Engineering and Management” for the supervisory level employees of Carborundum Universal Limited in 2017.
2. Prepared the project report for collaboration with Harita Techserv Limited which is the automobile consulting department under the TVS group.

## **ACADEMIC ACTIVITIES**

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1. I was a Post-Doctoral Research Fellow to the Energy Institute, The University of Texas at Austin, USA.
2. I am a freelance consultant in the fields of simulation, system dynamics and policy planning, applied multivariate statistical analysis, statistical design of experiments, econometric modeling and operations management.
3. I was an Associate Professor in the Division of Production and Industrial Engineering, Department of Mechanical Engineering, SCMS School of Engineering and Technology, Karukutty, India.
4. I am a reviewer for System Dynamics Society’s 37<sup>th</sup> annual international conference 2019 held in Albuquerque, USA.
5. I was a reviewer for System Dynamics Society’s 36<sup>th</sup> annual international conference 2018 held in Reykjavík, Iceland.
6. I was a reviewer for System Dynamics Society’s 35<sup>th</sup> annual international conference 2017 held in Cambridge, Massachusetts, USA.
7. I was a reviewer for System Dynamics Society’s 34<sup>th</sup> annual international conference 2016 held in the University of Delft, Netherlands.
8. I was a reviewer for System Dynamics Society’s 32<sup>nd</sup> annual international conference 2014 held in the University of Delft, Netherlands. I also attended the conference.
9. I have worked as a member of the consultancy group for “agriculture technical manpower planning” formed by the Govt. of India.

## **JOURNAL REVIEWER**

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1. Energy Strategy Reviews (Elsevier)
2. Journal of Cleaner Production (Elsevier)
3. Journal of Environmental Management (Elsevier)
4. Energy Policy (Elsevier)

5. Ecological Modelling (Elsevier)
6. Safety Science (Elsevier)
7. Systems Research and Behavioral Science (Wiley)
8. Energy Efficiency (Springer)
9. Quality & Quantity (Springer)
10. OPSEARCH (Springer)
11. Environment Development and Sustainability (Springer)
12. Journal of Industrial Engineering International (Springer)
13. International Journal of Energy Sector Management (Emerald)
14. International Journal of Manpower (Emerald)

#### **FOREIGN UNIVERSITIES VISITED**

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1. University of Texas at Austin, USA in 2017 - 2018.
2. University of Salford, Manchester, United Kingdom in 2017.
3. University of Delft, Netherlands in 2014.
4. University of St. Gallen, Switzerland in 2012.