Arun Pankajakshan

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Biography

Arun Pankajakshan is a final year Ph.D. candidate in Galvanin System Identification group at the Department of Chemical Engineering, University College London. His Ph.D. project focuses on developing a software framework for identification of kinetic models with special interests to automated model identification and identification of dynamic models.

Research interests

Process modelling • Design of Experiments • Model-based design • Numerical optimization • Statistical tools for modelling • Data analysis • Adaptive frameworks for model identification • Data-driven modelling

Education

University College London — London, UK
Ph.D. Candidate — 2017–present
Department of Chemical Engineering
Ph.D. research topic: Building computational frameworks for kinetic model identification

Indian Institute of Technology Roorkee — Roorkee, India
Master of Technology in Chemical Engineering — 2013–2015
Specialization: Computer Aided Process Plant Design
Department of Chemical Engineering

TKM College of Engineering — Kollam, India
Bachelor of Technology in Chemical Engineering — 2009–2013
Department of Chemical Engineering

Industrial Experience

BPCL (Bharat Petroleum Corporation Limited), Kochi Refinery — Kochi, India
Graduate Apprentice — 2016

- Trainee Engineer at Crude Distillation Unit and Aromatic Recovery Unit

Technical Skills

- **Programming Languages**
  Python (Pyomo, Casadi, Scikit-learn, Scipy, Numpy), Matlab, LaTeX, Colab
- **Software Skills**
  gPROMS, JMP, OriginPro, GitHub, LabVIEW (basic knowledge)

Projects

- **Kinetic modelling of HMF (hydroxymethylfurfural) oxidation**
  Collaboration project involving UCL, Cardiff Catalysis Institute and University of Liverpool
  Project goal: To develop and identify realiable kinetic model for gold catalysed HMF oxidation
  Contribution: Model development, analysis and validation
- **Optimal Design of Experiments in Microreactor Platform**
  Collaboration project within Department of Chemical Engineering UCL
  Project goal: To develop an automated microreactor platform for rapid and optimal kinetic study
  Contribution: Development of methods and algorithms that controls the platform
- **Adaptive experimental design methods for online parameter estimation**
  Project goal: Improving the existing *online model-based redesign of experiments methods* by adding a self-adaptive branch between inference and new information [Colab tutorial]

Scholarships and Awards

- **Doctoral Scholarship Award** 2017–2020
  Department of Chemical Engineering, UCL
- **Post Graduate Scholarship Award** 2013
  GATE (Graduate Aptitude Test in Engineering) scholar and recipient of
  MHRD scholarship by Government of India for pursuing post-graduation studies
- **Academic Excellence Award** 2009
  for securing highest mark in Chemistry in AISSCE (All India Senior School Certificate Examination)

Teaching

- **Post Graduate Teaching Assistant** at UCL 2018 – 2019
  Process Systems Modelling and Design (MEng) (CENG0025)
- **Post Graduate Teaching Assistant** at UCL 2018
  Process Systems Modelling and Design (MSc) (CENG0025-A7P-T1)

Publications

[1] **A. Pankajakshan**, P. Petsagkourakis, and F. Galvanin, "A framework for adaptive online model-based redesign of experiments in dynamic systems", in *Computer Aided Chemical Engineering*, vol. 50, Elsevier, 2021, pp. 1293–1298.

[2] C. Waldron, **A. Pankajakshan**, M. Quaglio, E. Cao, F. Galvanin, and A. Gavriilidis, "Model-based design of transient flow experiments for the identification of kinetic parameters", *Reaction Chemistry & Engineering*, vol. 5, no. 1, pp. 112–123, 2020.

[3] **A. Pankajakshan**, C. Waldron, M. Quaglio, A. Gavriilidis, and F. Galvanin, "A Multi-Objective Optimal Experimental Design Framework for Enhancing the Efficiency of Online Model Identification Platforms", *Engineering*, vol. 5, no. 6, pp. 1049–1059, 2019.

[4] M. Quaglio, C. Waldron, **A. Pankajakshan**, E. Cao, A. Gavriilidis, E. S. Fraga, and F. Galvanin, "On the use of online reparametrization in automated platforms for kinetic model identification", *Chemie Ingenieur Technik*, vol. 91, no. 3, pp. 268–276, 2019.

[5] M. Quaglio, C. Waldron, **A. Pankajakshan**, E. Cao, A. Gavriilidis, E. S. Fraga, and F. Galvanin, "An online reparametrisation approach for robust parameter estimation in automated model identification platforms", *Computers & Chemical Engineering*, vol. 124, pp. 270–284, 2019.

[6] C. Waldron, **A. Pankajakshan**, M. Quaglio, E. Cao, F. Galvanin, and A. Gavriilidis, "An autonomous microreactor platform for the rapid identification of kinetic models", *Reaction Chemistry & Engineering*, vol. 4, no. 9, pp. 1623–1636, 2019.

[7] C. Waldron, **A. Pankajakshan**, M. Quaglio, E. Cao, F. Galvanin, and A. Gavriilidis, "Closed-loop model-based design of experiments for kinetic model discrimination and parameter estimation: Benzoic acid esterification on a heterogeneous catalyst", *Industrial & Engineering Chemistry Research*, vol. 58, no. 49, pp. 22 165–22 177, 2019.

[8] **A. Pankajakshan**, S. M. Pudi, and P. Biswas, "Acetylation of glycerol over highly stable and active sulfated alumina catalyst: reaction mechanism, kinetic modeling and estimation of kinetic parameters", *International Journal of Chemical Kinetics*, vol. 50, no. 2, pp. 98–111, 2018.

[9] **A. Pankajakshan**, M. Quaglio, and F. Galvanin, "Experimentally Driven Guaranteed Parameter Estimation: a Way to Speed up Model-Based Design of Experiments Techniques", in *Computer Aided Chemical Engineering*, vol. 43, Elsevier, 2018, pp. 355–360.

[10] **A. Pankajakshan**, M. Quaglio, C. Waldron, E. Cao, A. Gavriilidis, and F. Galvanin, "Online model-based redesign of experiments for improving parameter precision in continuous flow reactors", *IFAC-PapersOnLine*, vol. 51, no. 15, pp. 359–364, 2018.

[11] A. Pankajakshan, E. Cao, M. Sankar, G. Hutchings, A. Gavriilidis, and F. Galvanin, "A robust model-based experimental design approach towards modeling reaction kinetics of Au catalyzed HMF oxidation under parametric uncertainty", 2017.

[12] **A. Pankajakshan**, E. Cao, M. Sankar, G. J. Hutchings, A. Gavriilidis, and F. Galvanin, "A model-based experimental design approach for the identification of kinetic models of Au catalysed HMF oxidation in a micropacked bed reactor", International Conference on Mathematics in (bio) Chemical Kinetics and …, 2017.

[13] P. Arun, S. M. Pudi, and P. Biswas, "Acetylation of glycerol over sulfated alumina: reaction parameter study and optimization using response surface methodology", *Energy & Fuels*, vol. 30, no. 1, pp. 584–593, 2016.