

Abhishek Dutta

Personal Information

Name:

Abhishek Dutta

Date of Birth:

22nd November, 1977

Nationality:

Belgian

Passport Number:

EP184507

Belgian National Number:

771.11.22-473.76

Address:

KU Leuven, Faculteit Industriële
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Campus Groep T Leuven, Andreas
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Leuven, Belgium

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Skills & Competencies

Language Competencies

- English (Professional proficiency)
- Dutch (Intermediate proficiency)
- Hindi (Professional proficiency)
- Bengali (Native proficiency)

Computer Skills

(Commercial Packages)

- ANSYS Fluent
- MATLAB
- MAPLE
- TECPLOT

(Open Source Packages)

- GNU,
- OpenFoam
- LATEX
- MFIX (& ParaView)
- Octave

Leisure

Sports football, badminton

Reading travelogue, autobiography

Functions

**Oct 2013 –
present**

Full-time guest Assistant Professor (voltijds gastdocent): Faculty of Engineering Technology, KU Leuven, Campus Groep T Leuven, Belgium & **Research Fellow**: Departement Materiaalkunde (MTM), KU Leuven, Kasteelpark Arenberg, Belgium

**April 2012 –
Sept. 2013**

Guest Lector (gastprofessor): Internationale Hogeschool Groep T, Leuven, Belgium

**April 2010 –
April 2012**

Postdoctoral researcher, BIOMATH, Department of Mathematical modelling, Statistics and Bioinformatics, Ghent University, Belgium

Research Interests

Mathematical modelling for Metallurgical processes, Process intensification, (bio) Chemical kinetics

**April 2010 –
April 2012**

Postdoctoral research

Targeting population heterogeneity at microscale for robust fermentation processes, Ghent University, BIOMATH, Belgium

**March 2006 –
March 2010**

Doctoral research

Modeling of Reaction, Attrition and Breakage in gas-solid multiphase flow systems using the Quadrature method approach, Ghent University, Laboratory for Chemical Technology, Belgium

**October 2003 –
March 2004**

Master research

*Cloning, sub cloning and sequencing of a few fragments of *Spodoptera litura* (SpltNPV) genome*, Institute of Genomics and Integrative Biology, Genetic Engineering Unit, India

**Nov 2001 –
January 2002**

Bachelor research

Modeling of flow over an assembly of pellets in a packed-bed, National Chemical Laboratory, Industrial Flow Modeling Group, India

Education

**March 2006 –
March 2010**

Doctor of Philosophy (Ph.D.), Ghent University, Belgium, Laboratory for Chemical Technology

**June 2002 –
April 2004**

Master of Technology (M.Tech), Jadavpur University, India, Department of Food Technology & Biochemical Engineering

**June 1998 –
April 2002**

Bachelor of Technology (B.Tech), University of Madras, India, Department of Chemical Engineering

**Nov 2004 –
July 2005**

Post-Graduate Diploma (PG Dipl) in Intellectual Property Management Administration and Law, Indian Institute of Social Welfare & Business Management, India

Industrial Experience

July 2004 – August 2006 Application Engineer (Sales & Marketing), Lechler India Pvt. Ltd.
(fully owned subsidiary of Lechler GmbH)

Teaching Experience

March 2012 – Present Reactor and Process Technology (4^e phase)
Unit Operations (3^e & 4^e phase)
Chemical Engineering Computing (3^e phase)
Process control (3^e phase, taught till 2015)
Reverse and Eco-Engineering (1^e phase, taught till 2013)

Master Thesis Supervision (selected list)

- 2006 – 2007 *Pablo Agudo Toyos* – Numerical prediction of wall erosion near a riser outlet
- 2008 – 2009 *Jaron Raeckelboom* – Numerical investigation on the influence of a particle size distribution of catalysts in a fluid catalytic cracking (FCC) riser
- 2013 – 2014 *Bart van Gansbeke* – An authenticity test for marzipan: SYBR Green I and Taqman Real-Time PCR assays for almond (*Prunus dulcis*) and apricot (*Prunus armeniaca*) for detection of traces of persipan
- 2012 – 2013 *Cédric Van Horenbeeck* – Experimental analysis and performance of an Upflow Anaerobic Sludge Blanket (UASB) reactor
- 2013 – 2014 *Ezeudegbunam Okechukwu* – Flocculation as a cost efficient harvesting method and the effect of Algal Organic Matter on flocculation in a Photobioreactor
- do - *Ousman Rahmeto Dibaba* – Development of a pilot scale Upflow Anaerobic Contactor (UAC) for biogas production from Vinasse
- do - *Yudi Diao* - Adsorption of cadmium from aqueous solution onto coffee grounds and wheat straw: Equilibrium and Kinetic studies
- do - *Lingping Zhou* – Biosorption of Cadmium(II), Lead(II) and Copper(II) by Baker's yeast (*S. cerevisiae*)
- 2014 – 2015 *Tim Croes* - Design and construction of a novel two-stage, bench-scale flat panel photobioreactor
- do - *Hanne De Crits* - Kinetics of the (+)-nootkatone bioconversion using whole cells of *Yarrowia lipolytica*
- do - *Mattias Durnez* - Development of a generic MATLAB® based mixed control model for reactions at the melt/slag interface
- 2015 – 2016 *Brecht Denis* - Evaluation of biodegradation at the water-oil interface of macroscopic oil droplets in an airlift bioreactor
- do - *Tim Van Geel* - Computational fluid dynamics (CFD) study of a packed bed reactor used for the partial oxidation of o-xylene to phthalic anhydride
- 2016 – 2017 *David De Baere* - Coupling of a Population Balance Model (PBM) and Computational Fluid Dynamics (CFD) applied to bubbly gas flows in a steel ladle
- do - *Nhu Quynh Hoang* - Computational Fluid Dynamics (CFD) Modelling of Three-phase Gas-stirred ladle

2016 – 2017 *Michiel Vanderwaeren* - Experimental investigation of the hydrodynamics of gas-solid fluidized bed using pressure fluctuation analysis

PhD Thesis co-supervision

Aug 2013 *Runni Mukherjee* - Development of a Fermented Soybean Meal based Product (with Jadavpur University, Kolkata India)

Sept 2017 *Mitiku Amanu* - Design and modeling of combined solar based solid state fermenter-drying unit to reduce anti-nutritional factors in soybean (with Bahir Dar Institute of Technology, Bahir Dar, Ethiopia)

Sept 2017 *Tim Croes* - Fractionation and purification of lignin fraction in a bio-refinery: Membrane-approaches as an economic and environmental alternative to classic separation techniques (with CIT, KU Leuven)

Feb 2018 *Tsegahun Mekonnen Zewdie* - Design, development and performance evaluation of solar-assisted membrane technology for water purification in Ethiopia (with CIT KU Leuven and Bahir Dar Institute of Technology, Bahir Dar)

Fellowships

April 2010 – April 2012 Postdoctoral fellowship of the Belgian Science Policy (BelSPO) under the ERA-IB project POPCORN

March 2006 – March 2010 Doctoral fellowship of Bijzonder Onderzoeksfonds (BOF) of the Ghent University under the GOA project MACKIE

Research and Industrial projects

Granted

2016 Injection of oxygen in a reactive liquid bath (BBH Berzelius Stolberg GmbH, Stolberg) : *Industrial*

2017-ongoing Computational Fluid Dynamics (CFD) modeling of Argon Oxygen Decarburization (AOD) converter (APERAM, Genk) : *Industrial*

Applied

2018 Sustainable Utility for Providing Rejuvenated Aqua for Everyone through Novel Eco-Friendly Economical Route (SURYANEER). Proposal number: SEP-210504965.

2018 Novel and universal european circular economy stainless steel slag handling solution - Modular high value product pilot plant (NUOVA). Proposal number: SEP-210504965.

Guest Lectures abroad

February 2014 *Mathematical modeling in Food Engineering*
FTBE Department, Jadavpur University (India)

September 2015 *Engineering application of Population Balance Models*
Ingeniería en Biotecnología, Universidad Politécnica de Pachuca (México)

June 2016 *Chemical reaction Engineering in the design of Bioreactors*
Ingeniería en Biotecnología, Universidad Politécnica de Pachuca (México)

Guest Researcher hosted

October 1 – December 20, 2013 Rodrigo Melgarejo-Torres, Departamento de Biotecnología UAM-I, México

August 1 – October 30, 2014 Dulce Maria Palmerín-Carreño, Departamento de Biotecnología UAM-I, México

October 2 - December 15 2017 Sergio Valdivia-Rivera, Instituto Tecnológico Superior de Tierra Blanca, México

Papers in Conference Proceedings

L. Beyers, **A. Dutta**, S. Lahiri, B. Blanpain & F. Verhaeghe. Hybrid artificial Neural Network and Genetic Algorithm modelling of slag properties. . European Metallurgical Conference (EMC). Düsseldorf, Germany, 14-17 June 2015.

A. Dutta, R. Mukherjee, T. Sarkar, Z. Pinar, R. Chakraborty. A Linear Driving Force (LDF) approximation of moisture uptake kinetics in Soybean. International Journal of Agriculture and Food Science Technology: Vol. 5 (3). Agriculture, Food Engineering and Environmental Sciences - Sustainable Approaches (AFEESSA). New Delhi, India, 29-30 March 2014 (pp. 203-210).

P. Leyssens, **A. Dutta**, S. De Jonge, J. Buijs. (2013). Integral Engineering Education: an approach to implementation. Proceedings of the 41st SEFI Conference. SEFI Conference. Leuven, 16-20 September 2013 (art.nr. 85).

A. Dutta, R. De Keyser, **A. Dutta** & I. Nopens. Robust Nonlinear Extended Prediction Self-Adaptive Control (NEPSAC) of continuous bioreactors. In: IEEE 20th Mediterranean Conference on Control and Automation (2012), 658–664

S. Kar, P. Dhar, **A. Dutta** & I. Nopens. Development of a software tool for in silico biodiesel production from rapeseed oil. In: IEEE Intl. Conference on Green Technology and Environmental Conservation (GTEC 2011), 68-74.

S. Kar, S. Ganai, **A. Dutta**, D. Dutta & S. Chaudhuri. A sensitivity analysis study of enzyme inhibition kinetics through Cellular Automata. In: AIP Conference Proceedings (ICMOC 2010) 1298, 1, 301-306.

S. Chakraborty, **A. Dutta**, D. Dutta & S. Chaudhuri. Moisture absorption and swelling kinetics in bean seeds: A Generalized Maxwell-Stefan approach. In: AIP Conference Proceedings (ICMOC 2010) 1298, 1, 374-379.

E. Torfs, **A. Dutta** & I. Nopens, Investigating kernel structures for shear and Ca-induced activated sludge aggregation using an inverse problem methodology. In: 4th Intl. Conference on Population Balance Modeling (PBM), Berlin, Germany, Sep. 2010.

A. Dutta, J. Raekkelboom, G.J. Heynderickx & G.B. Marin. Understanding segregation and mixing effects in a riser using the quadrature method of moments. In: Computational Methods in Multiphase Flow V, Southampton, United Kingdom, June 2009.

Abstracts in Conferences

A. Dutta, M. Durnez, L. Beyers, B. Blanpain & A. Conejo. One- and two-phase mass transfer kinetic model for reactions at the melt/slag interface. International-Mexican Congress on Chemical Reaction Engineering (IMCCRE 2016), June 5-9, Querétaro (México).

A. Dutta, S. Lahiri & C. Castillo-Araiza. Design of plate type distillation column using hybrid differential evolution and ant colony optimization techniques. Congreso Internacional de Energía (CIE). 7-11 September, México D.F. (México)

J. Ayala Romero, **A. Dutta**, R. Ruiz Martínez, F. López Isunza & C. Castillo Araiza. Efecto de la turbulencia sobre la hidrodinámica en lechos empacados con baja relación diámetro de tubo-partícula. Academia Mexicana de Investigación y Docencia en Ingeniería Química (AMIDIQ). 5-8 May 2015, Cancún (México).

L. Stabel, B. Verbinnen & **A. Dutta**. Combined wheat straw-sawdust biosorption of Selenium using a continuous column setup. International Conference on Research Frontiers in Chalcogen Cycle Science & Technology. 28-29 May 2015, Delft (The Netherlands).

Z. Pinar, S. Gulen, **A. Dutta** & T. Öziş. An efficient numerical solution of Hsu model involving size variation in soybean hydration. AIMS Conference on Dynamical Systems, Differential Equations and Applications, 7-11 July 2014, Madrid (Spain).

Z. Pinar, **A. Dutta**, A. Majumdar, D. Constales & T. Öziş. Understanding population balances involving aggregation and breakage through homotopy approaches. Advanced Computational Methods in Engineering (ACOMEN). 23-28 June 2014, Abstract No. 87, Ghent (Belgium).

C. Castillo-Araiza, G. Chávez, **A. Dutta**, C. Nuñez-Correa, G. García-Martinez & J. De los Reyes-Heredia. On the kinetics of Pt-Pd/ γ -Al₂O₃ during the HDS of 4,6-DMBT. International-Mexican Congress on Chemical Reaction Engineering (IMCCRE). 7-13 June, 2014, Acapulco (Mexico).

A. Dutta, R. Mukherjee, T. Sarkar, Z. Pinar & R. Chakraborty. A Linear Driving Force (LDF) approximation of moisture uptake kinetics in Soybean. Agriculture, Food Engineering and Environmental Sciences-Sustainable Approaches (AFEESA), 29-30 March, 2014 New Delhi (India).

R. Mukherjee, T. Sarkar, **A. Dutta** & R. Chakraborty. Evaluation of the effect of moisture hydration in soybean meal. Non Thermal Processing Techniques: Emerging Innovation for Sustainable, Safe & Healthy Foods (NTPT), 21-22 March, 2014 Haldia (India).

Z. Pinar, **A. Dutta**, A. Majumdar, G. Bény & T. Öziş. Exact solutions of population balances equations via an Auxiliary Equation Method for growth, nucleation, breakage and aggregation. AIChE annual meeting, 3-8 November, 2013 San Francisco (USA).

A. Dutta, D. Constales, G. Bény & K.R. Sharma. Studies on the stability behavior of a depolymerization reaction based on modified Denbigh scheme for the reclamation of waste tires. AIChE annual meeting, 3-8 November, 2013 San Francisco (USA).

A. Dutta, Z. Pinar, G. Bény & T. Öziş. An auxiliary equation approach to exact solutions of population balance equations for growth, nucleation and aggregation processes. International Conference on Applied Analysis and Mathematical Modelling (ICAAMM), 2-5 June, 2013 Istanbul (Turkey).

S. Kar, K. Nag, **A. Dutta**, D. Constales & T. Pal. An improved Cellular Automata model for enzyme kinetics based on Genetic Algorithm. Mathematics in Chemical Kinetics and Engineering (MaCKiE). 4-6 February 2013, Chennai (India).

A. Dutta, S. Kar, D. Constales & I. Nopens. Modeling of first-order enzyme kinetic reactions: a Cellular Automata Approach In: 7th Intl. Workshop on Mathematics in Chemical Kinetics and Engineering (MaCKiE), May 18-20, 2011, Heidelberg (Germany).

A. Dutta, R. De Keyser, **A. Dutta** & I. Nopens. Nonlinear extended prediction self-adaptive control (NEPSAC) of a coupled, time-varying biochemical system. In: Book of Abstracts 30th Benelux meeting on Systems and Control, March 15-17, 2011, Lommel (Belgium).

A. Dutta, R. Fernandes, A. Heins, A. Lantz, A. Jensen, K. Gernaey & I. Nopens, I. Modeling the Residence Time Distribution in a batch fermentor: comparison of CFD prediction with experiment. AIChE Annual Meeting. 16-25 October 2011, Minneapolis, (USA).

R. Fernandes, M. Carlquist, L. Lundin, A. Heins, **A. Dutta**, I. Nopens, A. Jensen, A. Lantz & K Gernaey. Heterogeneous microbial populations: using flow cytometric data for building dynamic distributed models. AIChE Annual Meeting. 16-25 October 2011, Minneapolis, (USA).

A. Dutta, S. Kar, D. Constales & I. Nopens. Modeling of first-order enzyme kinetic reactions: a Cellular Automata Approach. Mathematics in Chemical Kinetics and Engineering (MaCKiE). 18-20 May 2011, Berlin (Germany).

R.L. Fernandes, K.V. Gernaey, **A. Dutta**, I. Nopens & A.D. Jensen. Population balance models for microbial populations: describing heterogeneity in fermentors. 4th Intl. Conference on Population Balance Modelling (PBM), Sep. 15-17, 2010, Berlin (Germany)

A. Dutta, D. Constales, G.J. Heynderickx & G.B. Marin. Application of the Homotopy Perturbation Method (HPM) to solve particle population balance model of a Circulating Fluidized Bed. In: Intl. workshop on Mathematics in Chemical Kinetics and Engineering (MaCKiE), February 8-11, 2009, Ghent (Belgium).

A. Dutta, P.D. Rao, S. Mitra & J.P. Guerin. Effective patent management strategy for technology-based SMEs. In: 6th Annual Conference on Information Science and Technology Management (CISTM), July 31-August 2, 2008, New Delhi (India).

G. Mishra, I. Chaudhury, **A. Dutta** & R.H. Das. Identification and characterization of Serine/Threonine kinase gene of *Spodoptera litura* Nucleopolyhedro Virus Genome. BIOTECH, October 13-15, 2004, New Delhi (India). [Poster]

Invited stay abroad

April 2 – April 12, 2014 Department of Mathematics, Faculty of Science, Ege University, Izmir (Turkey)

July 9 – August 11, 2014 Departamento de Biotecnología, UAM Iztapalapa, México D.F. (México)

Travel Grants

Sept 2015 FWO travel grant for México (dossier nr° K1.C18.15N)

June 2016 FWO travel grant for México (dossier nr° K1.662.16N)

Dec 2017 FWO travel grant for India (dossier nr° K1.H68.16N)

Workshops attended

March – April 2008 *Uncertainty in complex engineering systems: modeling by Monte Carlo simulation*, KU Leuven, Belgium

March – April 2007 *Computational Fluid Dynamics: Introductory course*, Vrije University Brussels, Belgium

Academic Services

PhD Jury Member Rodrigo Melgarejo-Torres. Departamento de Biotecnología UAM-Iztapalapa, Mexico
Study of mass transfer, kinetic and deactivation of a three phase partitioning bioreactor using whole cells.
11th July, 2014.

Hamed Ravash. Departement Materiaalkunde (MTM), KU Leuven, Belgium.
3D phase-field simulations of sintering and coarsening in polycrystalline multi-phase materials.
10th December, 2014.

Editorial Board member Journal of journal of environmental engineering and landscape management (JEELM), Taylor & Francis (UK)

Conference Organizing body Congreso Internacional De Energía (International Energy Conference) Mexico, September 7-11, 2015
5th International Chalcogen Conference (G-16 Asian), India, December 19-21, 2016

References

prof. dr. ir. Guy Marin Laboratory for Chemical Technology, Ghent University (Belgium)

prof. dr. Vivek V. Ranade School of Chemistry and Chemical Engineering, Queen's University Belfast (UK)

prof. dr ir. Bart Blanpain Department of Chemical Engineering, Queen's University Belfast (United Kingdom)

prof. dr. Denis Constales Department of Mathematical Analysis, Ghent University (Belgium)