

MSc in Chemical and Biochemical Engineering



Preface

In the early 1980s I experienced a study program at DTU inspired from the best Chemical Engineering Departments in the US and the UK. The program was taught in Danish and only for Danish students. The globalization has changed our approach: More than 10 years ago we started teaching all our graduate courses in English and since then students from all over the world have entered our graduate programs. Today about half of our graduate students come from abroad. In parallel, our partner companies and our graduates all operate on the global market, in which Asia plays a still increasing role.

My first contact with China was in 1986 through late Professor Mooson Kwauk, Director of the Institute of Chemical Metallurgy (now IPE), Chinese Academy of Sciences (CAS). Later I had the pleasure of meeting Mr. Jinghai Li during his Postdoctoral studies in Europe (now Vice President of CAS and previously Director of IPE), and in 1989 I had the chance to visit China for the first time.

Since then we have grown good relations between DTU Chemical Engineering and Institute of Process Engineering (IPE). When DTU a few years ago decided to participate in the cooperation in the Sino-Danish Center for Research and Education, we were ready, together with IPE, to take responsibility for growing a high profile, research-based MSc education for Chinese and Danish students. Now we can offer a highly competitive two-year program in Chemical and Biochemical Engineering for ambitious and dedicated young students with a BSc in Chemical Engineering or closely related fields. We offer a challenging study in an inspiring environment with highly qualified professors from Denmark and China. Students from Denmark and China work together – learn from each other – and build a network for a true international career. I sincerely welcome our new students to the program.

Kim Dam-Johansen
Professor, Head of Program

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Engineers with an MSc in Chemical and Biochemical Engineering are key figures in research and development of methods and equipment aimed at commercial and sustainable transformation of raw materials into valuable products. Sustainable and environmentally acceptable production processes are in demand. Existing production facilities must reduce pollution, and new must be designed to prevent environmental harm. Successful work in those areas requires the scientific and technological capabilities that are the core of the MSc program in Chemical and Biochemical Engineering.

The Program

The program is a research based Master of Science program. It focuses on theoretical, experimental and practical aspects of chemical and biochemical engineering that are of relevance for product design, process design and production in chemistry, biotechnology, food, pharm and energy. Key elements are

- Processes rooted in chemical or biochemical engineering,
- Cross-disciplinary and cross-cultural design and development,
- Sustainability of biomass based chemical production and fuel conversion,
- Knowledge about Chinese culture and business environment integrated in the program.

The program leads to an MSc degree in Chemical and Biochemical Engineering, fully compatible with the similar program at DTU.

Career Opportunities

The MSc program gives you a solid starting point for contributing to the development of your society, bringing chemical and biochemical innovation from laboratories to useful production. Graduates are qualified to work in innovation driven enterprises of any size.

For some graduates the MSc degree will be the starting point for PhD or industrial PhD studies.

You will be specially qualified to work in challenging international environments.

Your base in this intercultural program makes an international consulting career a possibility.

Admission Requirements

Admission to the MSc-program in Chemical and Biochemical Engineering is based on the applicant holding a bachelor degree in chemical engineering, biochemical engineering, chemical technology, biotechnology or related fields. Specifically, the following prerequisites apply:

1. A strong, working knowledge of mathematics and natural sciences based on 1-1½ years formal courses (60-90 ECTS), distributed among different subject areas approximately thus:

Engineering Mathematics	20-30 ECTS
Organic and inorganic chemistry	20-30 ECTS
Thermodynamics and physical chemistry	10-15 ECTS
Physics	10-15 ECTS
Total, mathematics and natural sciences	60-90 ECTS

2. Basics of chemical and biochemical engineering based on ½-1 year of formal courses (30-60 ECTS), distributed among different subject areas approximately thus:

Appl. thermodynamics, mass and heat transfer, unit ops with laboratory	15-25 ECTS
Math. modeling, advan. engineering math., process control, dynamics	05-15 ECTS
Chemical kinetics and reaction engineering	05-15 ECTS
Basic life science, biochemistry, fermentation technology	05-15 ECTS
Total, chemical and biochemical engineering basics	30-60 ECTS

3. High-level English language proficiency.

Prospective applicants with other backgrounds than chemical or biochemical engineering or technology should contact the head of the educational program before applying.

Program Structure

To obtain the degree MSc in Chemical and Biochemical Engineering the student must

- Pass examinations in mandatory courses, consisting of general competence (GC) and technological specialization (TS) courses, adding up to 90 ECTS points,
- Complete a Master Thesis work of 30 ECTS points within the field of the program

The courses and their semester placements are shown below

Semester 1

Type	Course Name	ECTS	SDC	DTU #
GC	Transport Processes	10	TP	28530
TS	Industrial Reaction Engineering	7.5	IRE	28443
TS	Industrial BioReaction Engineering	5	BRE	28345
TS	Laboratory Experiments	Cont.	EXP	–
TS	Progress in Research	Cont.	PIR	–
TS	Biorefinery	05	BF	28872

Semester 2

Type	Course Name	ECTS	SDC	DTU #
GC	Process Design - Principles and Methods	10	PRO	28350
TS	Energy and Sustainability	5	SUS	28870
TS	Green Challenge	5	GRC	–
TS	Summer School in Unit Operations	7.5	SUO	–
TS	Progress in Research	Cont.	PIR	–
TS	Green Chemical Engineering	5	GCE	–
TS	Laboratory Experiments	5	EXP	–

Semester 3

Type	Course Name	ECTS	SDC	DTU #
	GC Technology, Economics, Management and Organization	10	TEM	42490
	TS Fluidization and Multiphase Flow	5	FLD	-
	TS Combustion and High Temperature Processes	5	COM	28244
	TS Progress in Research	5	PIR	-

Semester 4

Type	Course Name	ECTS	SDC	DTU #
	Master Thesis Work	30	TH	-

The column SDC shows a provisional SDC identifier for each course. The column “DTU #” shows the course numbers of DTU courses partly or fully equivalent with SDC courses.

Teaching schedule

Except for the courses mentioned below, all courses are organized in 3-week blocks, each covering 5 ECTS points. 10-point courses thus consist of two 3-week blocks, but these are separated by one or more blocks of other courses, official holidays or semester breaks.

Industrial Reaction Engineering consists of a 4.5-week section in the first semester.

Laboratory Experiments is divided in two sections distributed over semester 1-2.

Progress in Research consists of 12 lectures on current research topics evenly distributed over semester 1-3. Each lecture is assigned a half-day for the lecture and some follow-up work, but additional homework will be expected. The lecture days are placed as needed in the regular 3-week blocks of other courses.

Biorefinery is divided into a 1-week section and a 2-week section in the first semester.

Process Design-Principles and Methods consists of a continuous 6-week block in the second semester.

Technology, Economics, Management and Organization consists of a 5-week section in the third semester.

Green Challenge is divided into a 1-week section and a 2-week section in the second semester. The 2-week section is expected to take place at DTU.

Summer School in Unit Operation consists of a 4.5 week section in the second semester. This course is expected to take place at DTU.

This organization of the teaching provides an opportunity for concentrated and in-depth work with each subject, allowing for close contact with teachers and teaching assistants in each course period.

Detailed course schedule for the students enrolled in 2017 can be seen in the teaching calendar in page 10-12.

Special Provisions

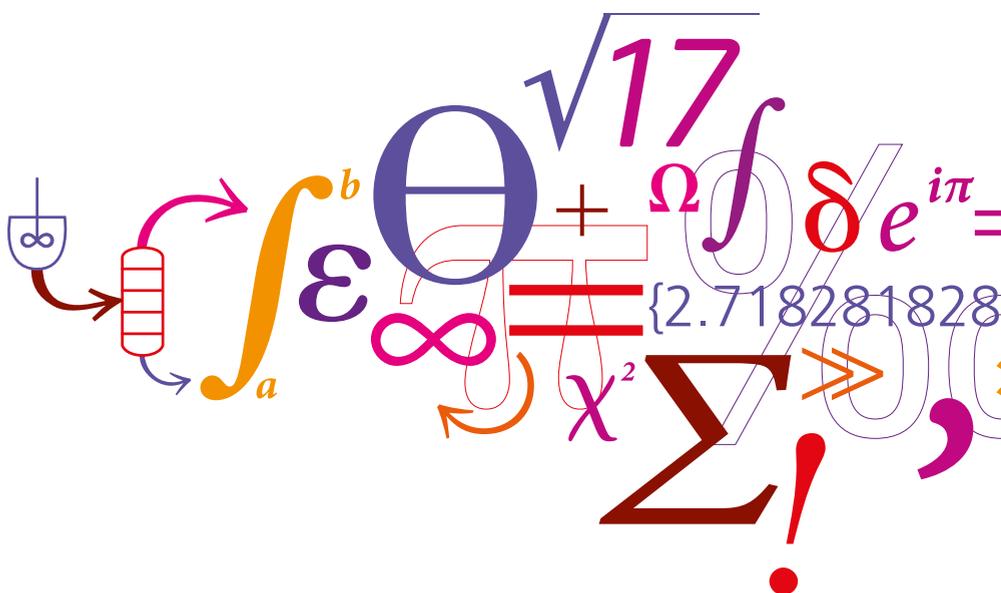
The program leads to a double degree from the Technical University of Denmark (DTU) and the University of the Chinese Academy of Sciences (UCAS). Hence exams follow regulations applying to DTU, and that means that some exams are assessed with participation of ministerially appointed external examiners from the official Danish Corps of External Examiners.

Written and oral exams contributing in part or in full to the final grade are usually assessed by internal examiners, with some of the exams involving the participation of external examiners. Project reports, homework solutions, and essays may be assessed by the teachers only. No external examiner participates if the course evaluation is characterized as “internal”. The MSc Thesis must always be assessed by an external examiner, who must also be present at the oral presentation of the project. At least 1/3 of the ECTS points (including MSc Thesis) should be earned with participation of an external examiner.

All courses and the MSc Thesis will receive a grade in the Danish scales (either the 7-step numerical scale or the two-step pass/not passed scale) for the MSc degree from DTU, and a grade in the Chinese scales (either 100 point-based scale or the two-step pass/not passed scale) for the MSc degree from UCAS. At least 2/3 of the ECTS points must be earned through courses (including MSc Thesis) assessed using the Danish 7-step scale and the Chinese 100 point-based scale.

Contact

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Green Chemical Engineering
Laboratory Experiments
Progress in Research

CVs for teachers

Suojiang Zhang, Professor
Kim Dam-Johansen, Professor
Jens Abildskov, Associate Professor
Jakob Munkholt Christensen, Assistant Professor
Philip Loldrup Fosbøl, Associate Professor
Peter Glarborg, Professor
Jing Guan, Associate Professor
Xinjuan Hou, Associate Professor
Jakob Kjøbsted Huusom, Professor
Andreas Ibrom, Senior Scientist
Christine Ipsen, Associate Professor
Birte Holst Jørgensen, Senior Scientist
Lars Georg Kjørboe, Technical Manager
Xiaodong Liang, Assistant Professor
Weigang Lin, Professor
Huiquan Li, Professor
Songgeng Li, Professor
Xingmei Lv, Professor
Jianquan Luo, Associate Professor
Manuel Pinelo, Associate Professor
Wenli Song, Professor
Wei Wang, Professor
Yinhua Wan, Professor
Xiaobo Wan, Professor
Stig Wedel, Associate Professor
John Woodley, Professor
Hao Wu, Assistant Professor
Xiangping Zhang, Professor
Hanne Østergård, Professor

200 kg/m³

Courses



Photo: Christian Ove Carlsson

Industrial Reaction Engineering

Points: 7.5 ECTS

Duration of course: 1 X 4.5 weeks

Time periods: Fall semester, weeks 36-41

Teachers:

Professor Kim Dam-Johansen (responsible)

Assistant Professor Hao Wu

Aim (general objectives):

To provide the students with a fundamental and practically applicable understanding of industrial important types of reactions and reactors that can be used in chemical and biochemical production processes and in pollution control.

Learning objectives:

A student who has met the objectives of the course will be able to:

- characterize solid particulates with respect to size, size distribution, shape, porosity, texture
- calculate effective diffusion coefficients in simple structures
- establish and solve mathematical models for gas-solid reactions (transport phenomena coupled to chemical reactions)
- evaluate structure models for gas-solid reactions
- establish and solve models for gas-liquid-solid reactions
- explain the enhancement factor for gas-liquid reactions
- analyse and simplify complicated reaction engineering problems in order to establish mathematical models for the main phenomena
- evaluate calculations for reaction engineering problems in order to use the results for practical design

Content and perspective:

A major part of chemical reactions in production processes and in gas cleaning processes takes place in multi-phase reactors, e.g. Production of Pharmaceuticals, calcination of lime in the production of calcium hydroxide, production of cement, combustion of solid and liquid fuels in the production of power and heat, catalytic and non-catalytic cleaning of flue gas and catalytic production of important products in different reactors including two or more phases. The examples are homogeneous or heterogeneous catalyzed, gas-solid, gas-liquid, liquid-solid and gas-liquid-solid reactions that take place in a number of different reactor types (batch fixed bed, moving bed, spray absorbers, packed towers, membrane reactors, fluidized bed reactors, entrained flow reactors etc.). The theory covering the different types of reactions and a number of the reactors is expounded together with examples. During the semester the students cooperate in teams solving practical oriented reactor design problems.

Module structure and teaching approach:

The course will consist of ordinary lectures, individual home assignments and two comprehensive course assignments to be solved in groups.

Literature (course material):

Course notes, three home exercises, three course assignments.

Assignments and exam, evaluation:

Evaluation: Danish 7 step scale, external examiner.

Exam note:

The course is evaluated based on three home exercises, three course assignments, and an individual oral exam. The reports are uploaded and are to be turned in on DTU Campusnet.

Course note:

The course content will be partly identical to DTU course 28443 Industrial Reaction Engineering.

Transport Processes

Points: 10 ECTS

Duration of course: 2 X 3 weeks

Time periods: Fall semester, weeks 42-44 and weeks 48-49 plus 51

Teachers:

Associate Professor Stig Wedel (responsible)

Associate Professor Peter Szabo

Aim (general objectives):

To introduce the participants to the modeling and numerical description of flow, heat and mass transport based on the fundamental equations of change.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Describe the molecular processes behind viscosity, thermal conduction and diffusion
- Obtain analytical solutions for flow problems with simple boundary and initial data
- Formulate and analyze models for combined flow and heat transport
- Formulate and analyze models for combined flow and diffusion
- Formulate and analyze models for combined flow and chemical reaction
- Do order of magnitude estimates for key quantities such as fluxes, reaction rates and equilibration times
- Use CFD for the simulation of flow with combined heat and mass transport (COMSOL)
- Evaluate the accuracy of approximations obtained by Computational Fluid Dynamics
- Formulate models for transport with a small or large parameter (boundary layers)

Content and perspective:

Mechanisms for the transport of momentum (flow), energy and mass in chemical and biological systems. Introduction to computational fluid dynamics (CFD) as basis for analysis and simulation of transport processes. Applications in the design of equipment and analytical instrumentation in the chemical, biotechnological and pharmaceutical industry.

Module structure and teaching approach:

The course will be concentrated in two blocks of about 3 weeks duration. Both blocks begin with two weeks containing 6 full day sessions, each composed of a lecture (~2 hr), CFD exercise (~2 hr) and problem solving (~4 hr). The full day sessions are placed Monday, Tuesday and Thursday. Remaining days are used for preparation and follow-up. The last week of each block will be used for work on and completion of two projects including analytical and numerical work. Block 1, ending with Project 1, is on fluid flow. Block 2, ending with Project 2, is on mass or heat transport coupled with fluid flow. The last lectures in block 2 takes up one of two special subjects: Either non-Newtonian fluids and turbulence or heat transport by radiation depending on teacher's preference.

Literature (course material):

R. B. Bird, W. E. Stewart, E. N. Lightfoot: "Transport Phenomena", Wiley, latest English language edition. Notes, problems, CFD exercises and projects uploaded on CampusNet.

Assignments and exam, evaluation:

The report on Project 1 contributes 20%, and the report on Project 2 contributes 20% of the final grade.

The final 4 hour written exam (open book) contributes 60% of the final grade.

Evaluation:

Danish 7 step scale, external examiner.

Exam note:

The exam is to be held in Lyngby (DTU) and Beijing (SDC) simultaneously.

Course note:

The course content will be identical to DTU course 28530 Transport Processes.

Industrial BioReaction Engineering

Points: 5 ECTS

Duration of course: 3 weeks

Time periods: Weeks 45-47

Teachers:

Professor John M Woodley

Aim (general objectives):

The reactors used in the bio-industries are designed according to the same general principles as reactors elsewhere in the chemical industry. However, there are some quite specific characteristics of bio-reactions which require specialist treatment, e.g. the complex stoichiometry and thermodynamics. Using a quantitatively based approach, fermentation processes are analyzed with respect to feasibility for the production of bio-based chemicals, and scale-up. Biochemistry, microbiology, sustainability and chemical engineering are all used to obtain a deeper insight into the complex world of bioreactions and their associated processes.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Describe the role of fermentation processes in the context of processes for production of industrial chemicals
- Calculate mass balances for fermentations including gas-liquid mass transfer
- Calculate carbon and degree of reduction balances for fermentation processes
- Evaluate the feasibility of fermentation processes in an industrial context
- Analyze the consistency of experimental data using simple models
- Describe different types of growth kinetic models
- Calculate the heat of production of fermentation process
- Describe the principles for design and scale-up of a bioreactor

Content and perspective:

Role of fermentation in industrial manufacture of chemicals. Stoichiometry of cellular reactions, degree of reduction balances, yield coefficients and black box models. Mass balances evaluation of the feasibility of fermentation processes in an industrial context. Growth kinetics. Thermodynamics of bioreactions and heat balances. ATP balances and energetics. Scale-up and design of fermentation processes. Process evaluation project.

Module structure and teaching approach:

Lectures and exercises

Literature (course material):

Bioreaction Engineering Principles, 3rd Edn, 2011, Jens Nielsen, John Villadsen and Gunnar Liden

Assignments and exam, evaluation:

The course is evaluated on the basis of a process evaluation project (50%), and a 4-hour written exam (50%).

Exam note:

Course note:

The course is equivalent to DTU course 28345.

Biorefinery

Points: 5 ECTS

Duration of course: 3 weeks

Time periods: Week 50, 2017 and week 3-4, 2018

Teachers:

Associate Professor Manuel Pinelo (responsible)

Associate Professor Jianquan Luo (assistant teacher)

Aim (general objectives):

To provide the students with basic knowledge about the biorefinery concept and integrated processes that convert biomass into multiple products of bioenergy, biomaterials and biochemicals.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Describe the physical and chemical structures of biomass and their potential use for production of bioenergy, biomaterials and biochemicals
- Identify and describe biomass resources (forest, agricultural, municipal and marine biomass), their occurrence and application in a biorefinery concept
- Identify and describe biomass constituents (starch, cellulose, hemicellulose, lignin, pectin, protein, lipids)
- Outline the principles of a biorefinery including chemical, biological and thermo-chemical conversion methods
- Outline and compare various methods of biomass processing for production of bioenergy products, biomaterials, chemicals and building blocks for chemical synthesis
- Design a theoretical and creative biorefinery based on scientific references

Content and perspective:

The course will give a broad perspective over the biorefinery concept by introducing the key integrated processes, such as biomass production, pretreatment, and chemical-, biological- and thermo-chemical- conversion. The lectures will focus on bioresources and single processing steps and will include industrial and scientific examples. In the case study the students will combine multiple processing steps into a novel biorefinery concept. There will be emphasis on sustainable systems throughout the course.

Module structure and teaching approach:

The course is divided into four main blocks:

1. Chemical characterization of biomass and recovery of biochemicals of industrial interest. Calculations include mass balances and stoichiometry.
2. Green processes/techniques used in biorefineries: Enzyme technology, Membrane technology, Clean solvents, Integration reaction-separation, Use of microwaves/ultrasound.
3. Introduction to Energy from biomass: Physical, microbiological and thermodynamical processes. Gasification and pyrolysis. Biogas. (To be continued in course "Production of Biofuels")
4. Other applications: Biomaterials.

Literature (course material):

The study material will be based on a compendium and international journal articles that will be uploaded on campusnet.

Assignments and exam, evaluation:

The course is evaluated on the basis of: 1) a project report (max. 5 pages per student) that the students do in groups (50%). Each group share the same raw material, but each of the students work on the production of a different product. Therefore, the assessment of the report is individual, and 3) a written exam (50%). The written exam will be held on the last day of the course.

Re-exam: It will consist of a written exam.

Exam note:

No aids are allowed in the final written exam (just a simple, non-programmable calculator)

Course note:

The course will include contents from the DTU course 28872 Biorefinery

Process Design - Principles & Methods

Points: 10 ECTS

Duration of course: 6 weeks

Time periods: Spring semester, weeks 14-19, 2018

Teachers:

Associate Professor Jakob Kjøbsted Huusom (Responsible)

Associate Professor Jens Abildskov

Assisant Professor Xiaodong Liang

Aim (general objectives):

Process design involves the solution of open-ended problems. The design problem is first defined and then broken down into a set of sub-problems (tasks) that are solved in a specified sequence. In each task, a set of design decisions are made, analyzed and verified. Therefore, the final process design and the path to achieve it depend on the design decisions taken in each of the design tasks. This means that there could be many process designs for the defined design problem. In this course, the process design problem solution is broken down into 12 design tasks, to be performed in a specific sequence.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Make design related decisions
- Use knowledge to solve practical engineering problems
- Collect and assess missing data and information from the open scientific literature
- Work in groups
- Use computer aided tools
- Generate and screen alternatives
- Verify and analyse simulation results
- Formulate process design problems and to develop systematic solution strategies
- Apply chemical engineering principles learned from other courses
- Apply “green” or environmental issues in process design

Content and perspective:

The course will be divided into two parts. The first part will deal with introduction to process design principles, the stages of the process design life cycle and the preliminary design steps (flow sheet synthesis, equipment sizing/cost-ing, economic evaluation, scheduling of batch operations, distillation sequences, pinch analysis). The second part will deal with conceptual design (advanced process synthesis (such as heat integration, heat exchanger networks, reactor networks, reaction-separation sequences, solvent selection), equipment selection, flow sheet optimization).

Module structure and teaching approach:

The course will consist of lectures and group works on the individual design projects.

Literature (course material):

Lorenze T. Biegler, Ignacio E. Grossmann and Arthur W. Westerberg: Systematic Methods of Chemical Process Design, Prentice Hall, 1997.

Assignments and exam, evaluation:

Evaluation of exercises/design project report plus oral presentation of design project and minor take home problems.

Evaluation:

Danish 7 step scale

Exam note:

A one-day seminar will be organized where all students will need to participate and each group will present their design project.

Course note:

The course content will be identical to DTU course 28350 Process Design – Principles & Methods.

Energy and Sustainability

Points: 5 ECTS

Duration of course: 1 x 3 weeks

Time periods:

Spring semester, weeks 20-22, 2018

Teachers:

Professor Hanne Østergård (responsible), DTU Chemical Engineering
Senior scientist, Prof. Dr. Andreas Ibrom, DTU Environment

Aim (general objectives):

The course aims at qualifying the students to combine previously acquired knowledge on chemical engineering with sustainability assessment methods. Environmental impacts and effects of resource constraints on energy supply and consumption will be analyzed at local and global scales.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Characterize and apply different principles of sustainability and sustainable development with focus on resource use and environmental impacts
- Describe and discuss the sensitivity of the climate system as well as of our society to GHG emissions from energy conversion and use
- Plan strategic sustainable development of a region with special focus on energy supply and consumption using back casting from sustainability principles
- Identify and discuss consequences of resource limitations for future energy technologies
- Discuss different criteria for sustainability of biofuels with focus on GHG emissions and energy consumption
- Explain the principles of life cycle assessments. Identify and discuss challenges in their application
- Perform and evaluate simple EROI calculations (energy return on energy investment) for different energy technologies
- Critically examine results from life cycle inventories to evaluate a number of different energy technologies mainly those based on biomass

Content and perspective:

The course aims at providing an understanding of general principles of sustainability and sustainable development in a system perspective. Briefly we will introduce how the climate system works and how it responds to greenhouse gas (GHG) emissions from fossil fuel emissions and land use change. We will discuss the implications of the interactions between population, energy consumption, affluence and climate change for sustainable development. We deal specifically with a number of renewable energy technologies with focus on bioenergy and evaluate them from a life cycle perspective based on energy and material flows in specific socio-ecological contexts. We deal with the basic concepts of life cycle assessments, e.g. system boundary, functional unit, co-products/by-products and normalization. Data sources and the implications of uncertainty of the calculated indicators for the quality of the assessment will be discussed.

Module structure and teaching approach:

Group exercises will evaluate sustainability and sustainable development using different indicators and simple mathematical models using data from scientific articles, reports and statistical information. The students will present their results orally as well as in short written reports (assignments).

Literature (course material):

Compendium consisting mainly of published papers and book chapters

Assignments and exam, evaluation:

The grade is based on a combined evaluation of two group assignments, which are weighted equally. In the evaluation of the first assignment is included an evaluation of a group presentation and an individual oral exam based on the first assignment report. The second assignment report consists of individual contributions to a common group analysis. Re-exam will take place at DTU up to 2 month after the course as an oral exam covering the full curriculum.

Internal examiner.

Course note:

The course is jointly offered by DTU Chemical Engineering and DTU Environment. It includes most of the DTU course 28870 Energy and Sustainability.

Technology Economics Management and Organization (TEMO)

Points: 10 ECTS

Duration of course:

Week 44-48, 2018

Time periods: 6 full days of lectures and exercises and 6 full days of group work, business challenge and feedback session.

Teachers:

Senior Scientist Birte Holst Jørgensen, Associate Professor Christine Ipsen

Aim (general objectives):

The general purpose of the course is to qualify the student (1) to analyse an organisation from a strategic, tactical and operational perspective; (2) to define the strategy and the business model of a company; and (3) to understand how engineers contribute to the competitive advantage of a company.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Identify and summarize key theories and models from the curriculum
- Explain and describe business models, organizational design and management activities in a specific case
- Apply theories and models from curriculum in a solution proposal for a specific problem and explain the relevance of the chosen theories and models
- Analyze a specific case from a strategic, tactical and operational perspective
- Formulate a synthesis including managerial, organizational and business perspectives in relation to a specific problem
- Select organizational interventions and management activities from curriculum to support the implementation of a strategy in a company and make an argumentation for your selection
- Outline the assumptions and preconditions of a specific problem and give an account of the consequences on the possible solution if these assumptions and preconditions are changed

Content and perspective:

The student will be introduced to theories and models of business design, management and organisation and to specific issues such as planning, organising, leading, controlling, strategy, innovation, and business models.

Module structure and teaching approach:

Lectures combined with cases, company presentation, projects and teamwork.

Literature (course material):

Jones and George (2012):

Essentials of Contemporary Management. McGraw-Hill Education 5th or 6th edition
(ISBN: 9780071318082 / 9789814575126)

Alex Osterwalder (2010): Business Model Generation. Wiley. ISBN: 978-2-8399-0580-0.

Assignments and exam, evaluation:

The course is evaluated on the basis of an individual oral exam on the entire syllabus (50%) and a group report on a business challenge from a company (50%).

Exam note:

Course note:

The course is equivalent to DTU course 42490 Technology Economics Management and Organization

Green Challenge

Points: 5 ECTS

Duration of course: 3 weeks

Time periods: Week 10, 24-25, 2018

Teachers:

Professor Kim Dam-Johansen (responsible)

Assistant Professor Hao Wu

Aim (general objectives):

To train the students to conceive, design, implement and operate sustainable solutions to energy and environment challenges.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Identify and analyze an energy or environment related challenge in China or Denmark
- Conceive chemical and biochemical engineering solutions
- Develop a solution concept to the point where the feasibility of the concept can be decided
- Evaluate the technical, economic and sustainable aspects of the solutions
- Present the results to publics and participate in scientific/non-scientific discussions

Content and perspective:

This course will provide the students an opportunity to use their knowledge obtained from the SDC MSc Program in Chemical and Biochemical Engineering to identify an energy or environment related challenge in China or Denmark, to develop a concept addressing the challenge, and to evaluate the feasibility of the concept with respect to technology, economy and sustainability.

Module structure and teaching approach:

In the course the students will work innovatively and independently to identify the challenges and develop solutions, through literature survey, process or product design, and evaluation of economy and sustainability. The developed project will be presented at the GrønDyst (Green Challenge) conference at DTU, where students from DTU and partner universities will present their projects related to sustainability, the environment or climate technology. The teachers will act as consultants to support the students' identification of challenges and preparation of the project, the abstract and the presentation for GrønDyst.

Literature (course material):

Official "GrønDyst" website (<http://www.groendyst.dtu.dk/>) and documents from DTU, textbooks, notes and other materials from courses in the first two semesters of the MSc program.

Assignments and exam, evaluation:

The students will work in teams of four students. Each team must: 1) participate in the GrønDyst at DTU, including submitting of abstract and presentation to the conference; 2) complete a report for the developed project for GrønDyst. The report is expected to be 10-30 pages and be submitted at the end of the course.

The course is evaluated based on the report (50%) and an individual presentation of the GrønDyst project to teachers or other internal examiners at an oral exam (50%). The presentation shall be 2 mins (same as the final presentation of GrønDyst), followed up by a discussion/question session of 5 mins.

Evaluation: pass/not pass, internal examiner.

Exam note:

Course note:

This course is only open to students of SDC MSc Chemical and Biochemical Engineering.

Summer School in Unit Operations

Points: 7,5 ECTS

Duration of course: 4.5 weeks

Time periods: week 26-30, 2018

Teachers:

Technical Manager Lars Georg Kiørboe (responsible)

Assistant Professor Jakob Munkholt Christensen

Associate Professor Philip Loldrup Fosbøl

Aim (general objectives):

To show the possibilities and limitations of the theory and achieve practical experience and improved understanding of the Unit Operation processes. This is performed by theoretical study and experiments in semitechnical and technical scale with process equipment, which is used in the chemical, biochemical and pharmaceutical industry.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Understand the core theory in Unit Operations
- Apply theory on practical experimental problems
- Analyze results and formulate conclusions concerning the quality and applicability of the results and to draw consequences for the process operation, plant design and functionality of the components
- Operate process units incl. data acquisition systems and measuring equipment in pilot scale size.
- Explain the design of processes
- Recognize technical components on real life plants
- Identify and explain practical tasks concerning sampling and measuring techniques
- Make a report on an experimental job in an organized way, which make it easy to read and understand calculations on conclusions

Content and perspective:

1-week theoretical study, 3-week experiments and half-week visits to companies and chemical plants.

In the 1-week theoretical study, the students will be introduced about core theory in Unit Operations, such as liquid and gas flow, absorption and distillation columns, drying, extraction, pumps, filtration, mixing, and heat transfer. The students will carry out four individual theory exercises.

In the 3-week experiments, in groups of two, the students perform and report on 4 exercises within the following areas: flow in pumps, pipes and fittings, flow through particle beds, heat transmission, distillation, absorption, extraction, filtration, membrane filtration, centrifugation, drying, evaporation/crystallization, agitation. The part of course is identical to DTU course 28121

Module structure and teaching approach:

In the 1-week theoretical study, the students will have lectures in the mornings, followed by exercise work in the afternoons.

In the 3-week experiments, average of 2 days of lab.work and additional 30 hrs of home work per week. Work in groups of 2.

Compulsory trips to chemical/biochemical companies and plants.

Literature (course material):

Course notes and slides prepared by DTU Chemical Engineering.

Assignments and exam, evaluation:

The course is evaluated based on the five individual theory exercises (25%) and the four reports (in a group of 2) on experiments (75%).

Evaluation: 7 step scale, internal examiner.

Exam note:

Course note:

This course is only open to students of SDC MSc Chemical and Biochemical Engineering.

Fluidization and Multiphase Flow

Points: 5 ETCS

Duration of course: 3 weeks

Time periods: week 36-38, 2018

Teachers:

Professor Wei Wang (responsible)

Professor Wenli Song

Aim (general objectives):

This course will provide comprehensive knowledge of fluidization and multiphase flow with fundamentals and applications related to chemical engineering and energy conversion.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Understand the flow regime of gas-solid flow and state of the art of research and application
- Manage basic calculations and solve practical problems related to fluidization
- Overview the modeling approached
- Design a fluidized bed reactor with preliminary requirement

Content and perspective:

- Fluidization phenomena
- Flow regime
- bubbling and circulating fluidized bed
- Multi-phase flow dynamics
- Models for the two phase flow
- Application of fluidized bed

Module structure and teaching approach:

- 10 full day lectures
- 2 home exercises
- 2 course assignments

Literature (course material):

Kunii and Levenspiel, Fluidization Engineering, (Butterworth-Heinemann 2nd ed) + Course note

Combustion and High Temperature Processes

Points: 5 ETCS

Duration of course: 3 weeks

Time periods: Fall semester, week 41-43

Teachers:

Professor Peter Glarborg

Aim (general objectives):

To provide the participants with a fundamental knowledge about combustion and other high temperature processes, including formation and reduction of harmful emissions.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Set up mass and energy balances for combustion systems
- Estimate flue gas amount and composition from stoichiometric calculations
- Use simplified and detailed chemical models to estimate combustion rate and formation of pollutant species
- Couple chemical and thermal analyses of reacting systems
- Set up simplified conservation equations for reacting flows
- Explain conceptual and practical differences between premixed and diffusion flames
- Assess the impact of turbulence on combustion rates
- Set up and use simplified model for droplet evaporation and combustion
- Set up and use simplified model for particle heating and pyrolysis
- Set up and use simplified model for char oxidation
- Use the above tools together with numerical solvers to evaluate and optimize industrial high-temperature processes

Content and perspective:

The course is related to both chemical and mechanical engineering, as both of these types of engineers work with fuels and emissions. Topics covered include combustion of gaseous, liquid and solid fuels in different combustion systems such as gas turbines, motors, pulverized fuel combustors, fixed bed and fluid bed, as well as related industrial high temperature processes. The different systems are treated theoretically and the students solve larger, practically oriented problems during the course. For nonchemical engineers, introductory material is presented at the start of the course.

Module structure and teaching approach:

Lectures and problem sessions, 2 larger course exercises

Literature (course material):

Steve Turns: An Introduction to Combustion; notes

Assignments and exam, evaluation:

Evaluation of exercises/reports. The grade is determined from an overall evaluation of two course exercises (90%) and three problem sets (10%).

Course note:

The course is equivalent to DTU course 28244 Combustion and High Temperature Processes

Green Chemical Engineering

Points: 5 ETCS

Duration of course: 3 weeks

Time periods: week 11-13, 2018

Teachers:

Professor Xiaobo Wan (QIBEBT, responsible)

Associate Professor Jing Guan (QIBEBT)

Professor Xingmei Lv (IPE)

Assoc. Professor Xinjuan Hou (IPE).

Aim (general objectives):

This course will provide comprehensive knowledge of new development of green chemistry and green chemical engineering with focus on green catalysis, green synthesis and materials

Learning objectives:

A student who has met the objectives of the course will be able to:

- Understand the basic concept of green chemical engineering and state of the art of research and application
- Carry out basic approaches of design catalysts for application to green chemical engineering
- Make preliminary design of a green process

Content and perspective:

- Introduction to Green Chemical Engineering
- History of Green Chemical Engineering
- Catalysis in green chemical Engineering
- Green chemical engineering in organic synthesis
- New green materials
- Green materials design

Module structure and teaching approach:

- 10 full day lectures
- 4 course assignments

Literature (course material):

Green Chemistry and Engineering: A Practical Design Approach by Concepción Jiménez-González and David J.C. Constable + Course note

Assignments and exam, evaluation:

4 course assignments are to be solved individually or in groups of 2-3 students. The final marks are given on the basis of the marks of the course assignments (25 % each).

Laboratory Experiments

Points: 5 ECTS

Duration of course: 3 weeks

Time periods: Distributed in semester 1-3

Teachers:

Professor Weigang Lin (Responsible coordinator)

Professor Songgeng Li (Instructor)

Professor Jianquan Luo (Instructor)

Professor Yinhua Wan (Instructor)

Professor Xiangping Zhang (Instructor)

Professor Xingmei Lv (Instructor)

Professor Huiquan Li (Instructor)

Aim (general objectives):

This course is designed to provide advanced experimental facilities at IPE to the students for experimentation skill in different areas of chemical and biochemical engineering.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Collaborate in team work during experiments
- Understand the appropriate approaches and the fundamentals of process engineering by carrying out the experiments
- Treat experimental data in a scientific way

Content and perspective:

The course contains 6 experiments in laboratories at IPE

- CaCO₂ decomposition in TGA
- Enzyme immobilization in membranes
- Membrane separation
- Gas adsorption
- Dissolution of cellulose by ionic liquid
- Catalysts synthesis and evaluation

Module structure and teaching approach:

- 6 laboratory experiments
- 6 reports

Literature (course material):

Notes and Experimental instructions

Assignments and exam, evaluation:

Perform 6 laboratory experiments in groups of 2-3 students in rotation. The final marks are given on the basis of the marks for the 6 reports (16.6 % each).

Progress in Research

Points: 5 ECTS

Duration of course:

12 presentations during three semesters

Time periods: Semester 1-3

Teachers:

Professor Kim Dam-Johansen (responsible)

Guest speakers

Aim (general objectives):

To provide the students with knowledge about front line academic and industrial research in the field of Chemical and Biochemical Engineering.

Learning objectives:

A student who has met the objectives of the course will be able to:

- Describe examples of industrial research and development
- Describe examples of front line academic research
- Understand the difference between academic and industrial research
- Read and understand scientific literature
- Participate in research based discussions

Content and perspective:

The SDC MSc program in Chemical and Biochemical Engineering, is a research based education. This course will provide the student with information about both academic research from Denmark and China and industrial research and development from companies with activities in both Denmark and China.

Module structure and teaching approach:

The course will consist of 12 half day lectures during the three semesters. The lectures will be presented by professors or high-level industrial researchers and research leaders.

Literature (course material):

Articles and prospect material.

Assignments and exam, evaluation:

Each student has to complete at least 10 reports about the individual research presentations. Evaluation pass/non-pass based on the reports.



Photo: Frederikke Zilstorff

Teachers' CVs





Suojiang Zhang, Professor
Professor and Director of Institute of Process Engineering (IPE)
Chinese Academy of Sciences
Phone: 86-10-82620867 (office), E-mail: sjzhang@ipe.ac.cn

Education

MSc., Department of Chemistry, Henan Normal University, Xinxiang, China, 1989

PhD., Zhejiang University, Hangzhou, China, 1994

Working Experience

Postdoctoral Fellow, Beijing University of Chemical Technology, Beijing, China, 1994-1999

Research Fellow of Japanese Government Scholarship, Nihon University, Tokyo, Japan, 1995.4-1997.9

Senior Engineer / Senior Consultant, Process Engineering R&D Center, Mitsubishi Chemical. Co., Japan, 1997.3-2001.8

Professor, Institute of Process Engineering, Chinese Academy of Sciences, 2001.8-present

Executive Director, Institute of Process Engineering, Chinese Academy of Sciences, 2008.8 -2010.7

Director, Institute of Process Engineering, Chinese Academy of Sciences, 2010.7 -present

Academic and professional awards

Hundreds Talents, Chinese Academy of Sciences, 2001

Beijing Municipality Scientific and Technological Innovation Prize, 2007

Distinguished Young Scholars, by National Natural Science Fundition, 2007

China Petroleum & Chemical Industry Association Technological Invents Prize, 2008

CCS -BASF Youth Knowledge Innovation Prize, 2008

Principal Scientist, National Basic Research Program of China (973 Program), 2008-2019

“National Talent” in the Ten Million New Century Talents Project, 2009

China Petroleum & Chemical Industry Association Youth Scientific and Technological Outstanding Contribution Prize, 2009

Second-class Award of National Natural Science of China, 2010

“Thousands of People Plan” Key Project Leader Talent, 2013

Hou Debang Chemical Science and Technology Achievement Award, 2014

Academician of Chinese Academy of Sciences, 2015

Membership Boards and Committees

Editor-in-Chief for Green Energy & Environment and Chinese Journal of Process Engineering

Editorial/Advisory Board for Green Chemistry, Industrial & Engineering Chemistry Research, Journal Greenhouse

Gases: Science and Technology, Science China-Chemistry, Chinese Journal of Chemical Engineering, Chinese Journal

of Process Engineering, Chinese Journal of Chemical Research

Guest Editor for Catalysis Today, Science China-Chemistry, Chemical Communications, Fuel Processing Technology

Fellow of the Royal Society of Chemistry

Research areas

Ionic liquids and green process engineering

Publications

He has published more than 320 SCI papers in academic journals with H-index of 41, and authored/edited 6 monographs, and filed for more than 90 invention patents.



Kim Dam-Johansen, Professor,
Head of Department, Head of Education
Department of Chemical and Biochemical Engineering,
Technical University of Denmark, Building 229, DK-2800 Kgs. Lyngby, Denmark
Phone: (+45) 45252845, E-mail: kdj@kt.dtu.dk
Date of birth: September 1, 1958

MSc 1983,
PhD Chemical Engineering DTU, 1987,
Assistant Prof. 1986,
Associate Prof. 1990, Professor 1993, DTU.
Group Vice President Hempel R&D 1998.
Department Head, DTU Chemical Engineering 2000, Founder and Director of Graduate School on Molecular Product and Process Technology.

Membership boards and committees

Hempel Foundation, Hempel Holding A/S,
VGB Scientific Advisory Board,
Danish Academy of Technical Sciences,
Danish Technical Chemical Foundation (chairman),
Steering groups and boards of Danish and international research programs, conferences and evaluation committees.

Awards etc.

Honorary Professor at the “Institute of Process Engineering” in Beijing, (2011).
Einstein Professor, Chinese Academy of Sciences, China, 2011.
Doctor Honoris Causa, Aabo Akademi University, Finland, 2011.
World most cited researcher in combustion and 5th most cited in Energy and fuels, (1998-2008).
Co-author of most cited article in Progress in Organic Coatings.
Fælleskemikernes Jubilee Prize, 1996. IFV Jubilee Foundation Prize for university-industrial cooperation, 1993.
The Dana Lim Prize for establishment of industrially oriented research center, 1993.
Best paper awards, (1991, 1993, 1995, 1997, 2001, 2003).
Peter Gorm Petersens Memorial Award, (1987).

Publications etc.

More than 240 ISI papers. H-index of 51. Several Patents. Most cited author in the field of Combustion, (1998-2008),
5th most cited author in the field of Energy and Fuels, (1998-2008).



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Department of Chemical and Biochemical Engineering
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Education

1999, PhD Technical University of Denmark
1995, MSc Technical University of Denmark

Positions

2002-: Associate Professor, Technical University of Denmark
1999: Assistant Professor, Technical University of Denmark

ORCID:

<http://orcid.org/0000-0003-1187-8778>

Distinctions and awards

Championship Team, 3rd International Industrial Fluid Properties Simulation Challenge (IFPSC) (2006)
(Category: State Conditions Transferability).

Memberships of scientific committees, review, positions of trust (selected)

2002-: Member of EFCE Working Party on Education (EFCE WPE). 2013-: Member of EFCE Working Party on Fluid Separations (EFCE WPFS). Reviewer for De Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO) (Eng.: Netherlands Organisation for Scientific Research) and peer reviewer for several international journals.

Publications

ISI journal publications (WoS): 97; Citations: ~ 852; H.index: 16 (excluding self citations: 14);
Other publ.: 6 popular/educational articles + 7 book chapters; Patent pending: "Method for purifying ethanol"; DTU ref. 95860
Books: Vol.15-I, DECHEMA Chem. Data Ser., DECHEMA, Frankfurt am Main. ISBN: 3-89746-051-3.
Vol.15-II, DECHEMA Chem. Data Ser., DECHEMA, Frankfurt am Main. ISBN: 3-89746-074-2.
Vol.15-III, DECHEMA Chem. Data Ser., DECHEMA, Frankfurt am Main. ISBN 978-3-89746-151-2.

Supervision of PhDs, 2008 - present (ongoing or finished in 2008 or later):

9 ordinary PhDs finished 2008-2016. 9 ordinary PhD ongoing.

Teaching and Education activities

Process Control + Process Engineering Laboratory + Separation Processes.
Grants, 2008 - present (ongoing or finished in 2008 or later):
IP Bioproduction (NMP-2CF-2007-026515), EU-FP6, NABIIT DSF-project 2106-05-0004.
SYNFERON (journal no. 4106-00035B by Innovation Fund Denmark).

Research collaboration with industry, 2008 - present:

Danish Companies: Novozymes, DONG Energy, Biosystemer Aps., Proces Design A/S, CP Kelco, LeoPharma, Novo Nordisk, Haldor Topsoe, International: Databases + property prediction methods incorporated into in-house software (derived from previous research projects) is accessed by several companies every day.



Jakob Munkholt Christensen, Assistant Professor
Department of Chemical and Biochemical Engineering
Technical University of Denmark
Søltofts Plads, Building 229, 2800 Kgs. Lyngby, Denmark
Phone: +45 45252810, E-mail: jmc@kt.dtu.dk
Date of birth: May 21, 1983

Degrees:

2011 Ph.D. (DTU) 2007 M.Sc. Chem. Eng. (DTU)

Positions:

Assistant Professor (DTU) since Dec 2013

Post Doc (DTU) 2011-2014

Post Doc (Oxford University) 2011

Research Area:

Catalysis, reaction kinetics and reaction engineering. Specifically within the topics of syngas conversion, production of synthetic fuels and catalytic rectification of exhaust gas from vehicles.

Distinctions and awards:

Teacher of the year at the Technical University of Denmark (DTU) 2015.

ISI publications (WoS): 15; Citations: 158; H.index: 7;

Google Scholar citations, H.index for all publications (172,5).

Supervision of PhDs, 2008 - present (ongoing or finished in 2008 or later):

Has co-supervised 3 PhD's to a successful completion. Currently supervising 1 PhD-student.

Teaching and Education activities:

Unit Operations of Chemical Engineering and Biotechnology (BEng). Lectures in the Sino-Danish Center.
Supervisor on several BSc/BEng and MSc projects.



Philip Loldrup Fosbøl, Associate Professor
Department of Chemical and Biochemical Engineering
Technical University of Denmark
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Phone: +45 45252868, E-mail: plf@kt.dtu.dk

Degrees:

2007 Ph.D. 2003 M.Sc. Chem. Eng. (DTU)

Positions:

Associate Professor (DTU) 2015

Assistant Professor (DTU) 2009-2015

Post Doc (DTU) 2007-2009

Research Area:

Lab experiments; Crystallisation and precipitation phenomena; Process design, simulation, modelling, and optimization; Transport phenomena; Thermodynamic modelling; Mathematical modelling; Chemistry and thermodynamics of electrolytes; Corrosion and scales; CO₂ capture and storage with absorption and desorption solvent regeneration; Predictive electrolyte models

Distinctions and awards:

Chosen to be one of the five best DTU Ph.D. candidates 2008 and received the Peter Gorm-Pedersens donation.

Memberships of scientific committees, review, positions of trust (selected)

Scientific Board of the DTU oil and gas centre creation

Member of Society of Petroleum engineers (SPE) and National Association of Corrosion Engineers (NACE)

Reviewer for: Ind. & Eng. Chem. Res., J. Chem. & Eng. Data, Solution chemistry, Int. J. Greenhouse Gas Control, J. of Energy & Fuels, and Chem. Eng. Com.

ISI publications (WoS): 34; Citations: 137; H.index: 8;

Supervision of PhDs, 2008 - present (ongoing or finished in 2008 or later):

3 PhDs and 2 Postdocs

Teaching and Education activities:

Unit Operations of Chemical Engineering and Biotechnology, Chemical Unit Operation Laboratory, Advanced Course on Thermodynamic Models: Fundamentals & Computational Aspects, SDC Summer School in Unit Operation.

Grants, 2008 - present (ongoing or finished in 2008 or later):

2007-2008 Project manager for a 4 month industrial co-operation with Siemens

2010 WP manager for the DTU participation in the EU FP7 CESAR/CLEO project

2012- WP manager for the DTU participation in the EU FP7 Octavius project

2012 Project manager for a 4 month industrial co-operation with Gassnova, Norway.

2013 Project manager for a 4 month industrial co-operation with Bilfinger, Norway.

2014 Project manager for a 7 month industrial co-operation with Bilfinger, Norway.

2014 Project manager for 2, 2-month industrial co-operation with Scion DTU.

2016 PI for three 2-month joint industry project with Scion DTU.

2016-2020 PI for EU DP funded BioCO₂ Biogas upgrading with DGC and Union Engineering.



Peter Glarborg, Professor
Department of Chemical Engineering,
Technical University of Denmark, Building 229,
DK- 2800 Kgs. Lyngby, Denmark
Phone: (+45) 4525 2840, E-mail: pgl@dtu.dk
Date of birth: August 15, 1959

Education

1987 Ph.D. Mechanical Engineering Technical University of Denmark

1984 M.Sc. Mechanical Engineering Technical University of Denmark

Professional experience:

2008- Professor DTU Chemical Engineering

1995-2008 Associate Professor DTU Chemical Engineering

1991-1995 Postdoctoral Res. Ass. DTU Chemical Engineering

1988-1993 Research Manager, Nordic Gas Technology Centre, Hørsholm
Nordic Research Program

1987-1990 Postdoctoral Research Laboratory of Heating and Air Conditioning,
Associate Technical University of Denmark

Professional activities:

DTU Elective Positions and Appointments:

Member of DTU Governing Board of Studies (2003-2005)

Member of Research Committee at Department of Chemical Engineering (2002-2015)

Member of Education Committee at Department of Chemical Engineering (1999-2005)

Professional Boards and Committees:

Member of the Board of the Danish Transport Research Institute (2001-2006).

Chairman of the Scandinavian-Nordic Section of the Combustion Institute (2007-2011).

Member of the Board of Directors of the Combustion Institute (2008-2014).

Editorships

Volume Editor, Proceedings of the Combustion Institute (2005-2007)

Associate Editor, Combustion and Flame (2006-)

Program Co-Chair for the 36th International Combustion Symposium

Awards and Prizes

The Hermers Fond prize (2002) for substantial scientific and educational contributions.

Gaspris 1991 from Dansk Gasteknisk Forening for an extra-ordinary effort and significant contribution to the development of gas technology in Denmark.

The Sugden Award (2013) for a paper which made a significant contribution to combustion research

Publications

The author of more than 200 archival journal and refereed conference articles within combustion and harmful emission control. H-index 44, 6300 citations.



Jing Guan, Associate Professor
Green Chemical Engineering Center (GCEC),
Qingdao Institute of Bioenergy and Bioprocess
Technology, Chinese Academy of Sciences (QIBEBT-CAS)
No. 189 Songling Road, Laoshan District, Qingdao, China, 266101
Phone: 86-532-8066 2725, E-mail: guanjing@qibebt.ac.cn

Education

2003.07–2009.08 Ph.D. in Physical Chemistry, Dalian Institute of Chemical Physics, CAS
2006.11–2007.02 Exchange Student, University of California, Santa Barbara (UCSB), USA
1999.09–2003.07 B.Sc., Liaocheng University

Professional experience:

2009.08 – 2013.12 Research Assistant, QIBEBT
2013.12 –present Associate Professor, QIBEBT

Research interest:

Density functional theory (DFT) calculations of catalysts and catalytic processes. Strong efforts are currently dedicated to the mechanistic understanding of the conversion of biomass-derived oxygenates.

Publications:

More than 20 peer-reviewed papers published in Adv. Energy Mater., J. Phys. Chem. Lett., J. Phys. Chem C., Appl. Catal. A, J. Mol. Catal., and Catal. Commun., etc.



Xinjuan Hou, Associate Professor
Institute of Process Engineering, Chinese Academy of Sciences
E-mail: xjhou@ipe.ac.cn

Education

MSc. In Institute of Coal Chemistry, Chinese Academy of Sciences in 2000
PhD in Graduate School of Chinese Academy of Sciences in 2003.

Work Experience

2004-2007 Post doctoral fellow at institute of chemistry, Leuven University, Belgium
2008-2009, Assistant Professor, Institute of Process Engineering, Chinese Academy of Sciences
2009-present, Associate Professor, Institute of Process Engineering, Chinese Academy of Sciences

Research Interests:

Novel functional material design and molecular simulation, including: (1) the structure and property of mineral materials; (2) the intercalation mechanism of organic molecules on mineral materials; (3) the electronic structure and property of photoelectric materials.

Publication

More than 30 papers filed.

- (1) X. J. Hou, H.Q. Li, Q.F. Liu, H. F. Cheng, P. He, S.P. Li, Theoretical study for the interlamellar aminoalcohol functionalization of kaolinite, *Applied Surface Science*, 2015, 347, 439.
- (2) X. J. Hou, H.Q. Li, P.He, Q.F. Liu, Molecular-Level investigation of the adsorption mechanisms of toluene and aniline on natural and organically modified montmorillonite *Journal of Physical Chemistry A* , 2015,119,11199.
- (3) X. J. Hou, H.Q. Li, S.P. Li, P. He Theoretical Study of the Intercalation Behavior of Ethylene Glycol on Kaolinite, *Journal of Physical Chemistry C*, 2014,118, 26017.
- (4) T.T. Zhang, K. Zhao, J. G. Yu, J. Jin, Y. Qi, H.Q. Li, X. J. Hou, G. Liu, Photocatalytic water splitting for hydrogen generation on cubic, orthorhombic, and tetragonal KNbO₃ microcubes, *Nanoscale*, 2013,5, 8375
- (5) X. J. Hou, P. He, H. Q. Li, X. R. Wang, Understanding the adsorption mechanism of C₂H₂, CO₂, and CH₄ in isostructural metal -organic frameworks with coordinatively unsaturated metal sites, *Journal of Physical Chemistry C*, 2013, 117, 2824.



Jakob Kjøbsted Huusom, Associate Professor
Department of Chemical and Biochemical Engineering,
Technical University of Denmark, Building 229,
DK-2800 Kgs. Lyngby, Denmark
Phone: (+45) 4525 2801, E-mail: jkh@kt.dtu.dk
Date of Birth: August 8, 1978

Degrees:

2008 Ph.D. 2005 M.Sc. Chem. Eng. (DTU)

Positions:

Associate Professor (DTU) since Aug 2014. Assistant Professor (DTU) since 2011

Post Doc (DTU) 2009-2010

Research Fellow/Assistant Professor (University of Trinidad and Tobago) 2008

Research Area:

In the course of my research I have seek to bridge chemical engineering with process automation and scientific computing. I have specialized in analysis of dynamic system in chemical engineering and development of dynamic simulation models for process understand and online process optimization. I see great opportunity to develop solutions for actual process systems through a fundamental and scientific analysis of the physical phenomena and dynamic behavior.

Distinctions and awards:

Nominated for the teacher of the year award by the student organization at DTU (2013).

Invited keynote speaker at FOCAPD (2014)

Memberships of scientific committees, review, positions of trust (selected)

International Federation of Automatic Control (IFAC) Technical Committees: TC 6.1 Chemical Process Control & TC 8.4 Bioprocesses and Biosystems.

NOC for PSE-2015/ESCAPE25. IPC for the ADCHEM, DYCOPS-CAB and IFAC WC.

ISI Publications (WoS): 44; Citations 169; H.index: 7

SCOPUS publications, citations, H.index (53; 197; 9)

Google Scholar citations, H.index for all publications (444; 12).

Supervision of PhDs, 2008 - present (ongoing or finished in 2008 or later):

4 finished and 6 is ongoing

Teaching and Education activities:

Optimizing Plantwide Control (MSc), Process Design (MSc), Experimental Unitoperations Introduction to process control (BEng) (25 MSc/BSc theses projects compleated). Lecture in the Sino-Danish Center. 45 MSc/BSc thesis projects competed (3 with SDC). Lecture in the Sino-Danish Center since 2014.

Grants, 2008 - present (ongoing or finished in 2008 or later):

2010 - 2011. FTP Post Doc grant Id. 274-08-0059. (1.3 M DKK.) - PI

2013 - 2017. HTF project grant. (19 M DKK) - WP leader

2015 - 2019. DSF project grant. SYNFERON (17 M DKK)

2015 - 2020. DSF project grant BIOPRO2 (40 M DKK) - WP leader



Andreas Ibrom, Senior Scientist
Department of Environmental Engineering
Technical University of Denmark
E-mail: anib@env.dtu.dk
Date of Birth: October 3, 1959

Professional profile

Senior scientist (DTU) and Professor for bioclimatology (Georg-August University, Göttingen, GAUG)
Biometeorologist and ecosystems researcher; research organization, project development, acquisition and management
University teaching of Industrial Ecology DTU, Denmark and Bioclimatology at the University of Göttingen, Germany

Education, mobility and training

2005 Marie Curie fellow (Risø National Laboratory for Sustainable Energy, DK)
2004 Apl. Professor for Bioclimatology (GAUG).
2000 Habilitation (GAUG)
1999 Marie Curie fellow at the University of Edinburgh, UK
1993 Dr. rer. nat. (PhD in natural sciences), GAUG
1980 Studies of Biology at Universities of Bielefeld and GAUG

Research experience

2016- ICOS Denmark station PI and steering group member
2011 - 2014 Steering committee and PI of the DSF funded project ECOCLIM
2010 - 2013 EU project CARBO-Extreme
2005 - Participant of the VKR funded CLIMAITE Center
2007 - Site manager for the Sorø long-term CO₂ flux observation site in 4 EU projects
(CarboEurope-IP, NitroEurope-IP, IMECC, CARBO-Extreme)
1998 - 2004 Tropical Forest Research in Indonesia and Venezuela. Extended management board of the
Collaborated Research Project (SFB-DFG 551)

International relations and Memberships

2016- Char of eth Climate Change review panel in FORMAS of the Swedish research council
2008- Member of the European Geosciences Union (EGU): Convener of session AS2.1: Air-Land Interactions
2000- Site PI of the global network FLUXNET
Peer view in more than 17 Journals

Publications in international books and peer reviewed scientific journals

71 peer-reviewed, international scientific publications in journals and books (66 ISI listed, H-index 24, 5179 times cited, Web of Knowledge), >80 other publications



Christine Ipsen, Associate Professor
Department of Management Engineering,
Building 424, Technical University of Denmark,
DK-2800 Kgs. Lyngby,
(+45) 4525 6014; fax: 4593 4467; e-mail: chip@dtu.dk
Date of birth: February 2, 1971

Current and recent positions:

1st February 2014 - : Group leader of the "Implementation and Performance Management" group at DTU Management Engineering
1st July 2012- 31st Dec.2015: Head of the PhD School at DTU Management Engineering
1st January 2012 - : Associate Professor at DTU Management Engineering
1st May 2007 – 31st December 2011: Assistant Professor at DTU Management
1st August 2006 – 30th April 2007: Inspector at the Danish Working Environment Authority
1st February 2002 – 31st July 2006: PhD student at DTU Management

Education:

- Passed the Educational training program for faculty members at DTU. (1st October 2010)
- PhD from Department of Production and Management at DTU (15th August 2007).
- Master in Science from DTU MANAGEMENT (8th March 2001)

Absences and leaves

Leave of absence: 19/06/2003 – 31/12/2003, Maternity leave I (Daughter): 06/10/2006 – 01/01/2007, Maternity leave II (Son): 15/12/2007 – 01/01/2009

Teaching

Course responsible, organizing and teaching "Research and PhD studies at DTU MAN" (2009-), Re-designing and teaching "Management & Organization"(2014-), Co-designed, organized and taught at "Change Management" (2001-2002), Course responsible "Technology, Economics, Management & Organization" (2016-)

Other scientific qualifications

- Editor of Special Issue of International Journal of Human Factors and Ergonomics. Issue title: Human Factors in Sustainable Interventions.
- Reviewer: Organizational Design and Management Conference (August 2014, Denmark), Work, Stress, and Health Conference (2013& 2014), Special Issue of Small Enterprises Research (2013), Knowledge Management –Research and Practice (2014-),Journal of Industrial Ergonomics (2011-).
- Paper awards: Best Paper Award for the paper "Engineering are using social media" (co-author) at the Design Conference 2014, and W.Hendricks and Ted Brown's young investigators award for the paper: "The use of the chronicle workshop as a method for evaluating participatory interventions" (co-author) at the Organizational Design and Management conference, august 2014.

Managerial experience

- Group leader of "Implementation and Performance Management" at DTU (1st February 2014-)
- Head of PhD School at Department of Management Engineering (1st July 2012- 31st Dec. 2015)
- Project manager of research project "Productivity and Well-being SMEs" (2011-2013), "Enthusiasm and stress in Academia (xxx)", "Distance management and Psychosocial work environment" (2014-2015).

Scientific focus areas

Knowledge management, management and leadership, development of work processes, design of participatory and primary stress management interventions, work-related stress and psychosocial work environment, organizational design.

International relations

- Member of International Network of Sustainable Organizational Interventions. (2012-).
- Research Affiliate at Center of Promotion of Health in New England Work Places. (U Conn – Storrs and UMass– Lowell). (2012-)
- Member of GKR-Network: Global Knowledge Research Network. (2012-)

Supervision

- Main supervisor of 3 PhD students (Knowledge Management and Social Media, Distance management in SMEs, Ambidextrous Lean)



Birte Holst Jørgensen, Senior Scientist
DTU Management Engineering
Technical University of Denmark, Building 426
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Phone: (+45) 4525 6946 E-mail: bhjq@dtu.dk

Education

1981, Technical vocational degree in mechanical engineering, Copenhagen Technical College
1992, Business Economics and Administration, Copenhagen Business School
1999, Political Science, University of Copenhagen

Academic degrees

Ph.D. Political Science
M.Sc. Business Economics and Administration

Employments

2012-2016, DTU Management Engineering, Deputy Head of Department
2009-2011, Risø DTU, Senior scientist
2005 – 2009, Nordic Energy Research, Director
2000 – 2005, Risø National Laboratory of Denmark, Senior scientist
1999 – 2000, PLS Ramboll Management, Consultant
1995 – 1995, University of Copenhagen, Research assistant
1992 – 1994, Storstrom Regional Development Center, Consultant
1984 – 1987, Escuela Politecnica Nacional, Ecuador, Technical expert

Areas of expertise

Science and technology policies; International energy technology cooperation; Business and regional development; Evaluation

Other information

Principal Coordinator for the Sustainable Energy programme, Sino-Danish Centre for Research and Education, 2011-;
Member of Energinet.dk Stakeholders' Forum, 2010- ;
Member of the Horizon 2020 Advisory Group on Energy, 2014-;
Vice chair and Danish representative, IEA Experts Group on R&D Priority Setting and Evaluation, 2009-;
Member of the International Network Programme Committee, Danish Agency for Science, Technology and Innovation, 2014-;
Member of the Governing Board, Joint Programme Initiative Urban Europe, 2013-;
Member of the board, large research programme RENERGI and ENERGIX, Research Council of Norway, January 2007-2016
Chairman of the Programme Committee for Transport and Infrastructure, The Danish Strategic Research Council, 2009-2014;
Vice Chair of the Mirror Group, European Hydrogen and Fuel Cell Technology Platform, 2006-2008.
Danish member of the Hydrogen Coordination Group, IEA, 2003-2005.
Member of Verdikt, high-level expert group on ICT foresight, Research Council of Norway, 2004-2005;
Member of High Level Expert Group "Key Technologies for Europe". Author of "Key Energy Technologies for Europe", 2005;
Expert evaluator of the Energy Area of Advance, Chalmers, February 2012;
Evaluator and reviewer for Directorate General Research, FP6, FP7 and Horizon 2020, 2006-;
Evaluator for Energinet.dk, 2005-;
Member of review panel for "Swedish Strategic Research Areas - Energy", Swedish Energy Agency, Fas, Formas, The Swedish Research Council & VINNOVA, May 2009;
Member of review team appointed by the Swedish Energy Agency regarding the research programmes of Swedish Gas Technology Center, Malmö, 2005 and 2008. Director, Nordic Energy Research, Norway, 2005-2009
Visiting scholar, Stanford University, Center for European Studies, 1996-1997
Technical expert, Escuela Politecnica Nacional, Ecuador, 1984-1987



Lars Georg Kiørboe, Technical Manager
Head of Pilot Plant (Centre for Experimental Process and Equipment Design)
Department of Chemical and Biochemical Engineering,
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Phone: (+45) 4525 2857, E-mail: lgk@kt.dtu.dk

Degrees:

1971 M.Sc. Chem. Eng. - DTU

1975 Ba Business adm. - CBS

Positions:

2006 – DTU Cemical Engineering, Tech. Man., Head of Pilot Plant.

2000-2005 – Mork Process, Project man.

1998-2000 – TK Energy, Man. of biomass gasification research

1995-2000 – Hilcot, Owner and director of consulting company

1991-1994 – Hasle Isomax, Man. director

1990-1991 – Falck Entreprise, Division man.

1982-1990 – DK Teknik (today Force Technologies), Man. of lab and pilot plant

1979-1982 – Niro Atomizer (today Gea Niro), High temp. research project man.

1974-1978 – Novo Industry (today Novo-Nordisk), research eng ineer iInsulin pilot plant

1971-1972 - DTU Chemical Engineering, amanuensis/membrane group

Research Area:

Novo: Insulin production processes based on extraction of glands.

Niro: Design of high temperature fluidized bed plant and processes.

DK Teknik: Industry consultancy research on large scale combustion of various wastes. Fuels characterization.

TK Energy: Design and operation of biomass gasification processes

DTU: CO₂ absorption using alkanolamines

Memberships of scientific committees, boards, etc

IDA Energy , previous chairman

ISPE Nordic

Publications (see also detailed list):

A large number of publications of mostly company related technical topics. Various conference papers Subjects:

Combustion technology, fuels and wastes, fluidized beds, gasification, slagging/fouling.

Book on Desulphurization

GMP compendium

Journal articles on membrane optimization; carbon capture

Latest article:

Tim L. Sønderby, Kim B. Carlsen, Philip L. Fosbøl, Lars G. Kiørboe, Nicolas von Solms: A new pilot absorber for CO₂ capture from flue gases: Measuring and modeling capture with MEA solution. International Journal of Greenhouse Gas Control 12 (2013) 181–192

Popular articles in Dansk Kemi.



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Phone: (+45) 4525 2877 E-mail: xlia@kt.dtu.dk
Date of Birth: February 7, 1982

Education

2014, PhD Technical University of Denmark
2007, MSc East China University of Science and Technology

Positions

2015.04-present, Assistant Professor, Department of Chemical and Biochemical Engineering, DTU
2014.08-2015.03, Post Doc/Researcher, Department of Chemical and Biochemical Engineering, DTU
2011.08-2014.08, Ph.D. student, Department of Chemical and Biochemical Engineering, DTU
2009.10-2011.07, R&D team leader, Honeywell Technology Solution (Shanghai/China, Calgary/Canada)
2007.05-2009.10, R&D Engineer, Honeywell Technology Solution (Shanghai/China, Calgary/Canada)

Research Area

My scientific research focuses on theories, models and algorithms for phase behavior of both homogeneous and inhomogeneous complex fluids, including fundamentals and applications of advanced association models (e.g. Perturbed-Chain SAFT and CPA, from phase equilibrium to derivative properties); theory frameworks (Density Gradient/Functional Theory) and computational algorithms (phase equilibrium, parameter estimation, differential equations, software development).

ISI journal publications:18; Citations:

166 ; H.index: 7; Patents: 0

Supervision of PhDs

Li Sun; Edgar Luis Camacho Vergara; Xianglei Meng; Xinyan Liu; Spardha Virendra Jhamb; Rafael Tini (Guest PhD)



Weigang Lin

Professor at Institute of Process Engineering, Chinese Academy of Sciences

Assoc.Professor at KT, DTU

E-mail: wglin@ipe.ac.cn; wl@kt.dtu.dk

Education

MSc. from Harbin Institute of Technology, 1984

Ph. D. from Delft University of Technology, 1994

Work Experience

1984 - 1988: Department Power Engineering, Harbin Institute of Technology, China, as assistant lecturer.

1988-1989 Visiting scholar, Department of Chemical Engineering, Delft University of Technology, The Netherlands.

1993-1994 Post doctoral fellow, Department of Chemical Engineering, Delft University of Technology, The Netherlands.

1994-1998 Research assistant professor, Department of Chemical Engineering, Technical University of Denmark

1998-present Associate professor, Department of Chemical Engineering, Technical University of Denmark (part-time)

1998-present Professor, Institute of Process Engineering, Chinese Academy of Sciences (part-time)

Award

Three times best paper award in the International Conference on Fluidized Bed Combustion in 1997, 2001 and 2003, Hundred Talent of CAS, 1998.

Research Interests:

Emissions of SO₂, NO_x in biomass fired combustor, Ash chemistry, Co-combustion of biomass, biomass pyrolysis and gasification, coal pyrolysis, gasification and combustion, Fluidized bed process, CO₂ capture and storage.

Publication

More than 50 peer review papers and one book chapter



Huiquan Li, Professor
Professor at Institute of Process Engineering, Chinese Academy of Sciences
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Education

MSc. From Dalian University of Technology in 1995

PhD in Chemical Engineering Department from the Dalian University of Technology in 1999.

Work Experience

- | | |
|---------------|--|
| 1999-2001 | Post doctoral fellow at Institute of Process Engineering |
| 2002-2005 | Associate Professor, Institute of Process Engineering, Chinese Academy of Sciences |
| 2006-present, | Professor, Institute of Process Engineering, Chinese Academy of Sciences |
| 2015-present, | Professor, University of Chinese Academy of Sciences |

Award

- | | |
|-------|--|
| 2005, | Award for the National Technological Innovation of China |
| 2010, | Award for Distinguished Young Scholars of CAS |
| 2016, | Award for Youth Science and Technology Innovation leader of Ministry of Science and Technology |

Research Interests:

Green chemical engineering and circular economy technology, including (1) green catalysis and process intensification of CO₂ capture, storage and utilization, specially catalytic conversion; (2) high value-added utilization and pollution control of solid residua, (3) metallurgical flue gas purification and eco-functional materials development, (4) system integration and ecological industry in chemical or metallurgical industry.

Publication

More than 160 papers and 50 patents filed

1. L.G. Wang, M. Ammar, P. He, Y.Q. Li, Y. Cao, F.J. Li, X.Han, H.Q Li, The efficient synthesis of diethyl carbonate via coupling reaction from propylene oxide, CO₂ and ethanol over binary PVEImBr/MgO catalyst, *Catalysis Today*, 2017, 281: 360-370.
2. W.J. Bao, H.T Zhao, H.Q. Li, S.G. Li, W.G Lin, Process simulation of mineral carbonation of phosphogypsum with ammonia under increased CO₂ pressure, *Journal of CO₂ Utilization*, 2017, 17: 125-136.
3. G.Y. Zhu, H.Q. Li, X. R. Wang, S.P. Li, X.J. Hou, W.F. Wu, Q. Tang, Synthesis of calcium silicate hydrate in highly alkaline system, *Journal of the American Ceramic Society*, 2016, 99(8); 2778-2785.
4. G.Y. Zhu, H.Q. Li, R.Y. Lin, S.P. Li, X.J. Hou, Q. Tang, Synthesis of superfine calcium carbonate during causticization in highly alkaline system for utilization of high-alumina fly ash, *Hydrometallurgy*, 2016, 165: 282-289.
5. W.J. Zhang, H.Q. Li, B. Chen. CO₂ emission and mitigation potential estimations of China's primary aluminum industry CO₂ emission and mitigation potential estimations of China's primary aluminum industry. *Journal of Cleaner Production*, 2015, 103: 863-872.



Songgeng Li, Professor
Professor at Institute of Process Engineering,
Chinese Academy of Sciences,
Deputy Director of State Key Laboratory of Multiphase Complex Systems,
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Education

Ph.D from Institute of Process Engineering, Chinese Academy of Sciences, 2004

M.S. from Northeastern University, China 1999

Work Experience

2004-2006 Visiting Scholar, Institute for Combustion Science and Environmental Technology, Western Kentucky University, USA

2006-2009 Postdoctoral fellow, Department of Chemical and Biomolecular Engineering, The Ohio State University, USA

2009-present Professor, Institute of Process Engineering, Chinese Academy of Sciences

Award

Houdebang Chemical Engineering Science and Technology Award for Young Researchers, Chemical Industry and Engineering Society of China, 2015

Research Interests

Biomass and coal conversions, CO₂ capture and pollutants control, which encompasses pyrolysis and gasification via thermal and/or catalytic method, NO reduction, mercury emission control

Publications

More than 40 peer review papers



Xingmei Lv
Professor at Institute of Process Engineering, Chinese Academy of Sciences
E-mail: xmlu@ipe.ac.cn

Education

M.S., Liaoning University, 1992
Ph.D., Qinghai Institute of Salt lakes, Chinese Academy of Sciences, 2005,

Work Experience

1992-2002, Lecturer/Associate Professor, Shenyang Normal University
2005-2007, Postdoctoral fellow, Institute of Process Engineering, Chinese Academy of Sciences
2008-2009, Visiting scholar, The University of Alabama, USA
2007-present, Full Professor, Institute of Process Engineering, Chinese Academy of Sciences

Award

2nd Class Award of National Natural Science of China, 2010
1st Class Award of China Petroleum & Chemical Industry Association Scientific and Technological Progress Prize, 2009
2nd Class Award of Beijing Municipality Scientific and Technological Innovation Prize, 2007

Research interests

Utilization of ionic liquids (ILs) in green industrial processes and sustainable technology, studying the interaction mechanisms of IL systems and developing better theories and methods on molecular design of ionic liquids.

The current research focuses on the following areas:

- Design and preparation of functional ILs
- Physical-chemical properties of ILs
- Applications of ILs
 - Separation and transformation of biomass in IL
 - Preparation and application of biomass composite materials in IL
 - Degradation of PET using ILs as catalyst

Publication

More than 70 peer review papers and 4 books and 3 book chapters and 9 patents filed.



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No.1 North Second Street, Zhongguancun, Haidian District, 100190, Beijing, China
Phone: (+86) 13466613740, E-mail: jqluo@ipe.ac.cn
Date of birth: May 31, 1983.

Education and Employment

- Dec. 2014- Associate Professor (Hundred-Talent Program)
Institute of Process Engineering, Chinese Academy of Sciences, China
- Nov. 2014- Dec. 2014 Researcher
Center for BioProcess Engineering, Technical University of Denmark, Denmark.
- Oct. 2012- Oct. 2014 Postdoc. (Hans Christian Ørsted postdoc position)
Center for BioProcess Engineering, Technical University of Denmark, Denmark.
- 2009- 2012 PhD Chemical Engineering
University of Technology of Compiègne, Compiègne, France.
- 2005-2009 MSc-PhD Biochemical Engineering
Institute of Process Engineering, Chinese Academy of Sciences, China

Publications résumé

~73 papers in International journals with peer review. h-index (05 July):19.

Teaching and Students' supervision résumé

Teaching: MSc Courses: 'Membrane Science and Technology' (Co-teacher)
'Membrane Technology' (Assistant teacher)
'Biorefinery' (Assistant teacher)

Supervision of BSc, MSc, PhD theses.

Research interests

Biocatalytic membrane and enzymatic membrane reactor, process intensification, membrane fouling mechanism and control, nanofiltration, biorefinery, micro-pollutant removal

Ongoing projects

Functionalization and integration of membrane processes (Hundred-Talent Program)

Integration of membrane process and chromatography (Chinese High Technology Research and Development Program)

Fundamental aspects in fabrication and application of multi-functional membrane coupled separation, adsorption and catalysis based on bio-inspired coating (Chinese National Natural Science Foundation)

Other professional merits and activities

Member of Youth Innovation Promotion Association of Chinese Academy of Sciences

Member of Young Scientists committee of China Society of Biotechnology

"Top reviewers" in 2012 awarded by the Editor-in-Chief of Desalination.

International reviewer in journals: Journal of Membrane Science, Separation and Purification Technology, Desalination, Bioresource Technology, Separation Science and Technology, Desalination and Water Treatment, Industrial Crops and Products, ACS Catalysis.

"Assistant editor" in Biocatalysis (De Gruyter Open).



Manuel Pinelo, Associate Professor
Department of Chemical and Biochemical Engineering,
Technical University of Denmark, Building 229,
DK-2800 Kgs. Lyngby, Denmark
Phone: (+45) 5041 7251, E-mail: mp@kt.dtu.dk
Date of birth: November 16, 1976.

Education and Employment

April 2011-	Senior Researcher- Associate Professor (from Sep. 2012) Center for BioProcess Engineering. Technical University of Denmark, Denmark.
Oct. 2009- April 2011	Assistant Professor Center for BioProcess Engineering. Technical University of Denmark, Denmark.
Oct. 2005- Oct. 2009	Postdoc BioCentrum. Technical University of Denmark, Denmark.
Acad. Year 2004/05	Postdoc Researcher. Dpt. Viticulture & Enology. University of California, Davis,
Acad. Year 2003/04	Visiting Scientist. Dpt. Proces. & Chemical Engin. University College Cork, Ireland.
2000-2004	PhD Universidad de Santiago, Spain/ Università degli Studi di Udine, Italy.
1999	MSc Chemical Engineering. Universidad de Santiago de Compostela. Spain.

Publications résumé

63 papers in International journals with peer review. h-index (06jun17):21.

Teaching and Students' supervision résumé

Teaching: MSc Courses: 'Membrane Technology' (course responsible)
'Advanced Enzyme Technology' (lecturer)
'Biorefinery' (course responsible)

Supervision of BSc, MSc, PhD theses and postdoc projects.

Ongoing projects

Enzyme immobilization on membranes for cascade reactions (Ørsted postdoc)
Extraction of added-value compounds from hempseed (GULP)
Separation in Biorefineries (BioValue)

Other professional merits and activities

Leader of Subtask "Membrane technology in Biorefineries" in International Energy Agency
Member of the board of the Nordic Filtration Society
Ph.D. Extraordinary Prize (Universidad de Santiago de Compostela), December 2005
Receiver of the 2001 University-Industry Foundation Award, September 2001
Experience in academic and Industry/Univ. research projects.
Regular member of PhD evaluation committees at Université Louvain-La-Neuve (Belgium), Technical University of Denmark, and University of Santiago (Spain)



Wenli SONG, Professor
Professor at Institute of Process Engineering, Chinese Academy of Sciences,
Director of Clean Coal Technology Department, IPE
E-mail: wlsong@ipe.ac.cn

Education

MSc. from Harbin Institute of Technology, Thermal Engineering, 1985

PhD. From Institut National Polytechnique de Lorraine, France, 2003

Work Experience

1986-1987, Engineer, Herman Research Laboratory, Melbourne Australia

1987-1996, Senior Engineer, Beijing Research Institute of Coal Chemistry

1997-2006, Associate Professor, Institute of Process Engineering, (IPE), Chinese Academy of Sciences (CAS)

2007-present, Professor, IPE, CAS

Award

2001 Prize of Invention of Chinese Academy of Sciences.

Research Interests:

Coal and biomass thermal conversion technology, including coal and biomass decoupling combustion, coal and biomass pyrolysis and gasification, VOC emission control by fluidized bed adsorption.

Publication

More than 100 peer review papers and two book chapters



Wei WANG, Professor
Professor at Institute of Process Engineering, Chinese Academy of Sciences
E-mail: wangwei@ipe.ac.cn

Education

M. Ch. E. from Sichuan University, Chemical Engineering, 1997
Ph. D. from Chinese Academy of Sciences, Chemical Engineering, 2001

Positions

2001-2004, Assistant Professor, Institute of Process Engineering, Chinese Academy of Sciences
2004-2008, Associate Professor, IPE, CAS
2008.5-present, Professor, IPE, CAS
2015.4-present, Deputy Director of State Key Laboratory of Multiphase Complex Systems

Awards and Distinctions

2015 CAST Qiushi Award for Eminent Young Scientists, China Association for Science and Technology
2014 Hou De-bang Young Chemical Engineering Scientist Award, Chemical Industry and Engineering Society of China
2012 Chemical Engineering Science Most Cited Authors Award, Elsevier
2012 MIC-Particuology Excellent Article Award, Micromeritics Inc. and Chinese Society of Particuology
2008 Lu Jia-Xi Young Scientist Award, Wang Kuan-Cheng Foundation

Research Interests

Multiphase flow and fluidization, Mass transfer, Reaction, Multiscale CFD Modeling, Industrial Reactor Simulation, CT Technology

Publications

More than 40 peer- review papers and six book chapters, six papers ranking top/most cited articles of Chem. Eng. Sci. and Int. J. Multiphase Flow. Full list of papers on the Google Scholar:
(<http://scholar.google.com/citations?user=eorSSw0AAAAJ&hl=en>)

- Li, J., Ge, W., Wang, W., Yang, N. et al. "From Multiscale Modeling to Meso-Science: A Chemical Engineering Perspective", Springer, 2013.
- Wang, W., Ge, W., Yang, N., Li, J. "Advances in Chemical Engineering", Chapter 1 - "Meso-scale modeling—the key to multiscale CFD simulation" (Ed. G. B. Marin), New York: Elsevier (2011) Vol. 40, pp. 1-58.
- Ge, W., Yang, N., Wang, W., Li, J. "Computational Gas-Solids Flows and Reacting Systems: Theory, Methods and Practice", Chapter 4 - "Interfacial Interactions: Drag" (Eds. S. Pannala, M. Syamlal and T. J. O'Brien), New York: IGI Global (2011) pp. 128-177.
- Wang, W., Li, J. "Handbook of Combustion", Chapter 12 - "Modeling of Fluidized Bed Combustion" (Eds. Maximilian Lackner, Franz Winter, and Avinash K. Agarwal), Berlin: Wiley-VCH (2010) Vol. 4, pp. 437-472.
- Wang, W. "Handbook of Fluidization", one chapter on "Fluid Mechanics" (Eds. M. Kwauk and H. Li), Beijing, Chemical Industry Press, 2008 (in Chinese).



Yinhua Wan, Professor

State Key Laboratory of Biochemical Engineering

Institute of Process Engineering, Chinese Academy of Sciences

No.1 North Second Street, Zhong-Guan-Cun, Haidian District, 100190, Beijing, China

Phone: (+86) 10 62650673, E-mail: yhwan@ipe.ac.cn

Date of birth: February 15, 1966.

Education

2001– 2004 D Phil in Biochemical Engineering, University of Oxford, UK

1990 – 1993 Ph D in Environmental Engineering, South China University of Technology, China

1985 – 1988 M Sci in Environmental Engineering, South China University of Technology, China

1981 – 1985 B Eng in Polymer Material and Engineering, Hefei University of Technology, China

Work Experience

2004 – Present Professor, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China

2001 – 2004 Postdoc, University of Oxford, Oxford, UK

1999 – 2001 Academic Visitor, University of Oxford, Oxford, UK

1995 – 1999 Associate Professor, South China University of Technology, Guangzhou, China

1990 – 1995 Lecturer, South China University of Technology, Guangzhou, China

1988 – 1990 Teaching Assistant, South China University of Technology, Guangzhou, China

Awards and Honors

The second prize of Science and Technology Contribution Awards from Chinese Academy of Sciences (2014)

The first prize of Technology Invention Award from China Petroleum and Chemical Industry Federation (2013)

The first prize of Science and Technology Progress Award from China National Food Industry Association (2009)

Chinese Academy of Sciences (CAS) “Hundred-Talent Program” (2004)

Membership Boards and Committees

Journal of Water Process Engineering (Editorial Board)

Chinese Society of Biotechnology (Vice Secretary General)

Asian Federation of Biotechnology (Executive Board Member, Vice Secretary General)

Research Interests

Bioseparation using membrane filtration,

Hybrid bioseparations

Fermentation-membrane separation coupling processes for bioproducts production

Wastewater treatment and water reuse by membrane technologies

Publications

More than 160 peer-reviewed papers and 4 co-authored monographs were published, and 48 patents filed (34 Chinese patents and 2 US patents granted).



Xiaobo Wan

Professor at Qingdao Institute of Bioenergy and Bioprocess
Technology, Chinese Academy of Sciences (QIBEBT-CAS)
E-mail: wanxb@qibebt.ac.cn

Education

B.Sc. at Nankai University, 1995
Ph.D. in Polymer Chemistry and Physics, Nanjing University, 2000
Ph.D. in Organic Chemistry, University of Pennsylvania, USA, 2008

Work Experience

2008-2010: Postdoctoral Fellow at Arkema Inc.
2010-present: Professor, QIBEBT

Award

2003, National Award of Science and Technology from Ministry of Education, China

Research interests

1. Polyurethane synthesis based on biodegradable materials and its applications;
2. Bio-mimetic materials and bio-inspired materials
3. Conjugated polymers for organic field-effect transistors and organic solar cells.

Selected Publication

Prof. Wan has published more than 30 papers on peer-reviewed journals. Here are some of them:

1. Gong, R.; Li, F.; Yang, C.; Wan, X. Inclusion of Cu nano-cluster 1D arrays inside a C-3-symmetric artificial oligopeptide via co-assembly. *Nanoscale* 2015, 7, 20369.
2. Wang, X.; Zhao, Z.; Ai, N.; Pei, J.; Liu, Y.; Wan, X. Benzopyrazinoisoindigo or its reduced form synthesis, clarification, and application in field-effect transistors. *European Journal of Organic Chemistry* 2016, 15, 2603.
3. Mu, Y.; Wan, X. Simple but Strong: A mussel-inspired hot curing adhesive based on polyvinyl alcohol backbone. *Macromolecular Rapid Communications* 2016, 37, 545.
4. Zheng, J.; Zhuang, X.; Qiu, L.; Xie, Y.; Wan, X.; Lan, Z. Antiaromatic Characteristic Analysis of 1,4-Diazapentalene Derivatives: A Theoretical Study. *The Journal of Physical Chemistry A* 2015, 119, 3762.
5. Zhao, N.; Ai, N.; Cai, M.; Wang, X.; Peib, J.; Wan, X. Thiophene-fused isoindigo based conjugated polymers for ambipolar organic field-effect transistors. *Polymer Chemistry* 2016, 7, 235.
6. Zhang, W.; Cao, S.; Qiu, L.; Qi, F.; Li, Z.; Yang, Y.; Huang, S.; Bai, F.; Liu, C.; Wan, X.; Li, S. Functional characterization of MpaG, the O-methyltransferase involved in the biosynthesis of mycophenolic acid. *Chembiochem: a European Journal of Chemical Biology* 2015, 16, 565.
7. Li, A.; Mu, Y.; Jiang, W.; Wan, X. A mussel-inspired adhesive with stronger bonding strength under underwater conditions than under dry conditions. *Chemical Communications* 2015, 51, 9117.
8. Guo, Z.; Gong, R.; Jiang, Y.; Wan, X. Tetrapeptide-coumarin conjugate 3D networks based on hydrogen-bonded charge transfer complexes: gel formation and dye release. *Soft Matter* 2015, 11, 6118.
9. Zhao, N.; Qiu, L.; Wang, X.; An, Z.; Wan, X. Synthesis of a thiophene-fused isoindigo derivative: a potential building block for organic semiconductors. *Tetrahedron Letters* 2014, 55, 1040.
10. Sun, X.; Mu, Y.; Zhang, J.; Wang, X.; Hu, P.; Wan, X.; Guo, Z.; Lei, S. Tuning the self-assembly of oligothiophenes on chemical vapor deposition graphene: effect of functional group, solvent, and substrate. *Chemistry-an Asian Journal* 2014, 9, 1888.
11. Qiu, L.; Zhuang, X.; Zhao, N.; Wang, X.; An, Z.; Lan, Z.; Wan, X. Benzo[f]benzo[5,6]indolo[3,2-b]indole: a stable unsubstituted 4n[small pi]-electron acene with an antiaromatic 1,4-diazapentalene core. *Chemical Communications* 2014, 50, 3324.
12. Qiu, L.; Wang, X.; Zhao, N.; Xu, S.; An, Z.; Zhuang, X.; Lan, Z.; Wen, L.; Wan, X. Reductive ring closure methodology toward heteroacenes bearing a dihydropyrrolo 3,2-b pyrrole core: scope and limitation. *Journal of Organic Chemistry* 2014, 79, 11339.
13. Jia, M.; Li, A.; Mu, Y.; Jiang, W.; Wan, X. Synthesis and adhesive property study of polyoxetanes grafted with catechols via Cu(I)-catalyzed click chemistry. *Polymer* 2014, 55, 1160.
14. Guo, Z.; Gong, R.; Mu, Y.; Wang, X.; Wan, X. Oligopeptide-assisted self-assembly of oligothiophenes: Co-assembly and chirality transfer. *Chemistry-an Asian Journal* 2014, 9, 3245.



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Date of birth: March 3, 1952

Education

1970, high school diploma, Birkerød Statsskole, Denmark
1976, MSc Chemical Engineering, Technical University of Denmark (DTU)
1980, Ph.D. Chemical Engineering, University of Houston (UH), Texas, USA

Appointments

Assistant Professor, Department of Chemical Industries, DTU, 1980-1983
Associate Professor, Department of Chemical Industries, DTU, 1983-1985
Visiting Scholar, Department of Chemical Engineering, UH, 1985-1986
Associate Professor, Department of Chemical Engineering, DTU, 1985-present

DTU appointments:

Program coordinator of DTU MSc Applied Chemistry and Chemical Engineering (200-2011)
Program coordinator of DTU International MSc in Chemical Engineering (2002-2006)
Head of Studies of MSc Chemical & Biochemical Engineering (2005-)

Professional activities

Teaching:

Chemical Reaction Engineering (1980), Chemical Process Technology (1981 - 1985), Lab. course in Chemical Reaction Engineering (1981 - 1990, 2005 - 2016), Design of Catalytic Reactors (1987 - 1995), Mathematical Modeling for Chemical Engineers (1991 -), Numerical Methods for Chemical Engineering Modeling (1996 - 2010), Introduction to bio, chemical and environmental engineering (part.) (2004), Design of biotechnological and environmental processes (part.) (2005), Introduction to Chemical and Biochemical Engineering (2006), Transport Processes (part.) (2007 -), Physiological Trans- port Phenomena (part.) (2009 - 2012).

DTU elective positions, and special duties:

Member, DTU Board of Chemical Engineering Studies and DTU Governing Board of Studies (1989 - 1991). Member and vice-chairman, DTU Staff-Student Committee for M.Sc. Program (1995 - 2001). Member, vice-chairman (2000 - 2001), Staff-Student Education Committees at Dept. of Chemical Engineering (2000 - 2001, 2005 -), Member DTU's Advisory Board on Buildings, later Committee on Study Environment (2001 -), Academic student advisor at Dept. of Chemical Engineering (2001-).

Research:

Participates in research projects aimed at reducing environmental load from cement and power plants and at getting a better understanding of ash deposition in boilers. Co-author of about 25 papers and conference contributions.

External appointments:

Ministry of Education's corps of external examiners, chemical engineering section (1994 -).



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Date of birth : January 6, 1961

Education

Chemical Engineering (BSc), UMIST, Manchester, UK, 1984
Biochemical Engineering (PhD), UCL, London, UK, 1988

Employment

Research Fellow, ICI Ltd (Billingham, UK) and Lecturer, Chemical Engineering, UCL, London, UK (1989-1994)
University Lecturer, Dept of Chemical and Biochemical Engineering, UCL, London, UK (1994-1998)
Reader, Dept Biochemical Engng, UCL, London, UK (1998-2003)
Professor, Department of Biochemical Engineering, UCL, London, UK (2003-2007)
Professor, Department of Chemical Engineering, DTU, Denmark (Since 2007)

Membership Boards and Committees

Editorial Board, Biocatalysis and Biotransformation (Informa)(2001)
Editorial Advisory Board, Engineering in Life Sciences (Wiley)(2002)
Editorial Board: Journal of Molecular Catalysis B (Elsevier)(2008)
Working Party, EFCE Process Intensification (DK representative)(2008)
International Peer Review Committee, BE-Basic (Delft, NL)(2010)
Scientific committee, ESAB (EFB)(DK representative)(2010)
Editorial Advisory Board, Biotechnology Journal (Wiley)(2010)
Scientific Advisory Board, Toulouse White Biotechnology (Toulouse, France)(2011)
Scientific Advisory Board, Manchester Interdisciplinary Biocentre (Manchester, UK)(2012)
Editorial Advisory Board, Bioprocess and Biosystems Engineering (Springer)(2013)
Editorial Advisory Board, Bioresources and Bioprocessing (Springer)(2014)
Editorial Board, Biotechnology Journal (Wiley)(2015)
Editorial Board, Process and Industrial Biotechnology (Frontiers)(2016)

Honours

Wardlaw Prize, University of Manchester, Manchester, UK (1984)
Horizons in Biotechnology Lecture, Dupont, Wilmington, DE, USA (1999)
Fellow, Institution of Chemical Engineers (FIChEmE), London, UK (2003)
DEng Chemical Engineering, UMIST, Manchester, UK (2004)
Visiting Professor, University College London, London, UK (2008)
Fellow, Royal Academy of Engineering (FREng), London, UK (2009)
Rita and John Cornforth Award (with UCL team), RSC, Cambridge, UK (2010)
Gambrinus Forum Lecturer, TU Dortmund, Germany (2014)

Publications

ISI peer reviewed articles: 240; Edited conference proceedings: 60; Edited book chapters: 23; Conference abstracts: 469; Popular scientific articles: 19; Citations: 5210; H-index: 39.



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Education

2011 Ph.D; Dept. of Chemical and Biochemical Engineering, Technical University of Denmark
2007 M.Sc; Dept. of Chemical and Biochemical Engineering, Technical University of Denmark
2004 B.Sc; Dept. of Chemical and Biochemical Engineering, Zhejiang University, China

Positions and Appointments

2015-now Assistant Professor Dept. of of Chemical and Biochemical Engineering, DTU
2013-now Program Coordinator, Sino-Danish Center for Education and Research (SDC)
2013-2015 Researcher Dept. of of Chemical and Biochemical Engineering, DTU
2011-2013 PostDoc Dept. of of Chemical and Biochemical Engineering, DTU
2007-2011 PhD Student Dept. of of Chemical and Biochemical Engineering, DTU

Research Area

Solid fuel combustion in fixed-bed, fluidized-bed and suspension-firing systems. Ash and emission related processes in thermochemical conversion of biomass and waste. Multiphase flow and high temperature reactions in cement production. Modeling of high-temperature reacting systems.

Academic Service

Reviewer for Journals: Combustion and Flame; Energy & Fuels; Fuel; Fuel Processing Technology; Environmental Science and Technology; Waste Management, Environmental Engineering Science; Resources, Conversion & Recycling; The Korean Journal of Chemical Engineering; Journal of Thermal Analysis and Calorimetry, Powder Technology, Review of Scientific Instruments.

Member of PhD evaluation committee: University of Zaragoza (Spain) , Tampere University of Technology (Finland)

Teaching and Supervision

PhD courses at DTU: Ash and Deposit Formation, Corrosion in Utility Boilers (2015),
Operational Challenges of Biofuel Utilization for Heat and Power Production and Bio Refinery (2013)
MSc course at DTU: Chemical Reaction Engineering Laboratory, (2016-)
MSc courses at SDC: Industrial Reaction Engineering, Green Challenge, Progress in Research, (2013-)
Supervisor of 7 DTU PhD students and 6 visiting-PhD students (2014-)
Supervisor of 31 MSc/BSc students at DTU/SDC (2008-)

Publication

21 ISI articles (citations: 190; H.index: 8) and 32 papers in conference proceedings



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Degrees

1999.03 - 2002.03 Ph.D., Chemical Engineering, Dalian University of Technology, China

1991.09 - 1994.07 M.Sc, Zhengzhou Institute of Chemical Engineering, China

1987.06 - 1991.07 A.B. Zhengzhou Institute of Chemical Engineering, China

Positions

2008.10 - 2011.04 Professor, Institute of Process Engineering, CAS, China

2006.08 - 2007.08 Researcher, Norwegian University of Science and Technology, Norway

2004.04 - 2008.10 Associate Professor, Institute of Process Engineering, CAS, China

2002.04 - 2004.04 Post Doc, Institute of Process Engineering, CAS, China

1994.07- 1999.03 Lecturer, Chemical Engineering, Zhengzhou University, China

Research interests

Process system integration, chemical thermodynamics, environmental impact assessment, techno-economic assessment of processes, properties and thermodynamic models of ionic liquid solvent, gas separation and purification with ionic liquids.

Awards and Prizes

National Award for Natural Sciences in China, 2010

National Science Fund for Distinguished Young Scientists in 2014

Nomination Award of the 4th Top Ten Outstanding Women in CAS in 2012

China Petroleum & Chemical Industry Association Scientific & Technological Progress Prize, 2008

Beijing Municipality Scientific and Technological Innovation Prize, 2007

Publications

150 papers in peer-reviewed journals, two authored monographs, and 51 issued invention patents,



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Date of birth: July 14, 1953

Education

- 1982- Ph.D. (Lic. scient.) in Population Biology, Aarhus University
1978- M.Sc. (Cand.scient.) in Mathematics, Aarhus University

Employments (last three)

- 2012- Member of Faculty at Department of Chemical and Biochemical Engineering, DTU
2001- Senior Research Specialist (entitled Professor since 2008) in sustainability assessment of combined energy and food systems, Biosystems Department, Risø-DTU (from 2012, Department of Chemical and Biochemical Engineering, DTU).
1991-2001: Head of Section/Programme with 25 to 35 employees: Plant Genetics and Epidemiology, Plant Biology and Biogeochemistry Department, Risø National Laboratory.
1982-1991: Assistant professor and from 1983 associate professor, Department of Animal Genetics, Royal Veterinary and Agricultural University, Copenhagen.

Scientific focus areas:

System analysis based on mathematical models and statistical analysis in collaboration with researchers in biology, agriculture, engineering and economy within the areas: 1) sustainability assessment (mainly energy accounting) in relation to food and biomass production and bioenergy, 2) population genetics and dynamics of different airborne plant pathogens on cereals, 3) population genetics, plant population ecology and plant breeding mainly in relation to agricultural ecosystems, e.g., spread of GMO's and characteristics of organic plant breeding, 4) animal genetics and statistical analysis of MHC associations.

Membership Boards:

Editorial Board of Springer Journal, Biophysical Economics and Resource Quality
Review Editor of Frontiers in Energy Research

Teaching at DTU at present (2017):

- Biofuel study line coordinator in the Master of Sustainable Energy.
- Responsible for the compulsory course 'Energy and Sustainability' within the Master of Sustainable Energy
- Contributes to the courses 'Process Design' and 'Biofuel production'.
- Responsible for PhD course 'Biorefinery and Sustainability'

3 selected publications

- Kamp, A., Østergård, H. & Bolwig, S. (2016). Environmental Assessment of Integrated Food and Cooking Fuel Production for a Village in Ghana. *Sustainability*, 8, 16 p., 404
1. Nimmanterdwong P., Chalermstinsuwan B., Østergård H., Piumsomboon P. (2017) Environmental performance assessment of Napier grass for bioenergy production. *Journal of Cleaner Production*, 165: 645-655
- Seghetta M, Østergård H, Bastianoni S. (2014) Energy analysis of using macroalgae from eutrophic waters as a bioethanol feedstock. *Ecological Modelling*, 288, 25-37



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