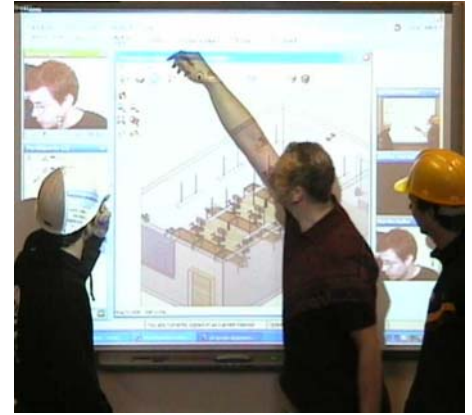


**Full Time   Part Time   Any Time   Anywhere**



# **MEngSc. Information Technology in Architecture, Engineering and Construction**

Alternatively, these engineers shall be able to continue on a research track (Ph.D.)

*Course Code for Registration at  
Postgraduate Applications Centre (PAC):*

**CKR 29**



**BIM  
and  
Lean  
Management**



**Energy  
Facilities  
People**



**Smart  
Buildings  
and  
Big Data**



**School of  
Engineering**

**<http://zuse.ucc.ie/CKR29>**

# ABOUT THE DISCIPLINE

## Information Technology in Architecture Engineering & Construction

### Pioneers



**GEORGE BOOLE (1815-1864)** wrote his most famous work 'An Investigation of The Laws of Thought' in Cork. The book describes Boolean Algebra in a systematic way.

**Boolean Algebra** is very useful on computers, since the binary numbers, combined through Boolean algebra, could be used to analyse electrical switching circuits.

**KONRAD ZUSE (1910-1995)**, a Civil Engineer, built world's first **program-controlled computer**. Zuse's 1936 patent application suggests a '**von Neumann Architecture**' with program and data modifiable in storage.

In 1945 Zuse describes '**Plankalkuel**', world's first **higher-level programming language**.

### Fundamentals



#### PROGRAMMING:

Module CE1005 provides knowledge in the development of algorithms using engineering examples. Students learn the basic principles of structured programming, object based programming, and file I/O. Students develop their first Windows applications.

#### DATA MANAGEMENT AND ANALYSIS:

Module CE3011 introduces Information Modelling and Database Management Technology. It provides knowledge about the major components of Database Management Systems. Students learn how to develop database models and formulate database queries. They use, manage, and administer their own database management system.

#### MODELLING AND VISUALIZATION:

Module CE2009 provides fundamental knowledge of computer graphics. It introduces Building Information Modelling using applications such as 3D or 4D-CAD. Students develop their first Computer Model in a team-based approach.

#### SUSTAINABLE BUILDING OPERATION:

Module CE4022 introduces Building Management Systems (BMS) and Energy Management Systems (EMS), Analysis of Building Performance by Multi-Dimensional Information Management and Decision Support for Energy Efficient Design. The module also deals with the application of Process Modelling techniques to address problems within Facilities Management.

### Master



#### THE MASTER (MEngSc) IT in AEC:

This programme is offered full-time and part-time. Lectures are delivered through the web.

**More than 100 students have graduated** from this programme since 2007. The network of graduates worldwide includes those from China, Europe and Australia.

#### Interdisciplinary Foundation

The compulsory modules provide in-depth knowledge of how to apply IT in the AEC-sector. Areas studied are Software Engineering, Energy Systems Management, Building Diagnostics, Facilities Management, IT for eBusiness, and Information Modelling and Retrieval.

Students are employed in Consultancy Practices, such as ARUP, multinational construction companies, such as BAM (formerly Ascon Rohcon) or Bilfinger, in Facilities Management (HSG Zander International) or in the Financial and Public sectors. Other graduates progressed with a PhD and were appointed Lecturers or Assistant Professors.

#### Specialisation

Electives offer a broad spectrum for specialisation, ranging from Finite Element Analysis, Automation in Construction, Virtual Construction to Virtual Enterprises, Knowledge Management or Computer Mediated Construction.

### Research



#### IRUSE

The Informatics Research Unit for Sustainable Engineering (IRUSE) was funded by Dr. Marcus Keane in 2000. In 2007 Professor Menzel joined the group.

Currently, IRUSE operates branches at UCC (Director Prof. Menzel) and NUI Galway (Director Dr. Keane).

Professor Menzel was the Director of SFI's Strategic Research Cluster ITOBO. Currently, he coordinates the EU-FP7 project CAMPUS21.

#### IRUSE-Cork

Since 2007 IRUSE-Cork has been involved in more than **15 research projects**. An average of **12 staff** are employed by IRUSE-Cork. Since 2010 **6 PhD-students** and one MEngSc (research) student **have graduated** from IRUSE-Cork.

In 2012 three **Researchers in Residence** of a multinational employer joined forces with the IRUSE-Cork team, supported by an **IDA agreement**.

### Network



#### ICT-EUROMASTER

Our MEngSc. Programme is delivered in collaboration with Guest Lecturers from 3 European Universities and 2 Industry Experts from Germany, Austria, and Slovenia.

#### RESEARCH COLLABORATIONS:

IRUSE-Cork has research partnerships with more than 25 organisations across Europe.

#### ACADEMIC MATTERS

The Chair of IT in AEC is responsible for all Academic matters, including **teaching, examination, and graduation**.

Marguerite Reardon,  
Executive Assistant to Prof. Karsten Menzel  
Western Gateway Building, 2<sup>nd</sup> floor, Room 2.12  
Tel: 00353-21- 420 - 5400  
Fax: 00353-21- 420 - 5450  
Email: marguerite.reardon@ucc.ie

#### RESEARCH

IRUSE-Cork is the **Research Unit** of the Chair of IT in AEC. It manages and coordinates all research projects.

University College Cork  
School of Engineering, Chair IT in AEC,  
Professor Karsten Menzel  
Tel: 00353-21- 420 - 5400  
Fax: 00353-21- 420 5450  
Email: k.menzel@ucc.ie



### Structures, Contacts





MEngSc. Information Technology in  
Architecture, Engineering and Construction

# Executive Summary

## CKR 29 Overview

The MEngSc Information Technology in Architecture, Engineering and Construction (AEC) will enable civil engineers and engineers from other related disciplines (mechanical, electrical, etc.) to implement, manage, and maintain sophisticated Information and Communication Technology in AEC and Facilities Management organisations.

Participants will understand Information and Communication Technology within the context of life-cycle oriented, sustainable management of complex built infrastructure systems.

Alternatively, graduates of this programme shall be able to continue on a research track (Ph.D.)

## CKR29 addresses

... the increased need for qualified IT-specialists in the AEC-industry.

## CKR29 prepares

... graduates and practitioners for careers in one of the most important sectors of the European economy;

- Engineers who wish to improve their IT-knowledge and management skills.
- Computer Scientists who wish to learn project management in the Construction, Facilities and Energy Management Sector.

## CKR29 Content

Young graduates and AEC-practitioners will improve their knowledge on:

- Smart Buildings and Building Information Modelling.
- Facilities and Energy Management.
- Virtual Construction, Collaborative Work and eBusiness.
- Knowledge Management and Software Engineering.

## CKR29 Quality

*"The material addresses emerging trends and presents state of the art and state of practice in the area of IT in AEC"*

*Dr. Fruchter, Stanford University (USA)  
External Examiner Report*

## CKR29 Graduate Profile

*The way this Master course is structured enables you to attend lectures and meet deadlines easily, while the sheer quantity of information available and the contacts made throughout the duration of the course can open doors of potential employment.*

*A friendly atmosphere, a wealth of knowledge and the latest technology allows you to find and develop your own particular interests. I would highly recommend a MEngSc (IT in AEC) to anybody who is looking to get ahead of the game in the engineering industry, and possesses a unique skill set.*

*Cormac McNamara  
full time student*

## CKR29 Recognition



The International eLearning Association (IELA), New York, USA awarded an 'Honourable Mention' degree in the category E-Learning to the course at its annual conference held in Klagenfurt (Austria) in 2012.



Postgrad Ireland awarded the title **Postgraduate Course of the Year** in the category Science and Engineering to the programme at its annual summit held in Dublin in 2014.

## CKR29 Anytime Anywhere

Lectures are offered in co-operation with 3 European Universities and industry experts from IBM, Bilfinger, Gas Networks, RPS Consulting and the Kerry County Council. Lectures are delivered in UCC and are also broadcast on-line. Lectures can be accessed from your home or workplace.

## CKR29 Enrolment

The programme can be pursued on a full-time (1 year) or part-time (2 years) basis; with an option to complete at postgraduate diploma level.

## CKR29 Fees

EU Students admitted to this programme in 2015/2016 will pay an annual tuition fee of €7,000, Non-EU student fees are €14,000. Additionally, the programme offers seats under the "Springboard" initiative of the HEA. If taking the course part-time a reduced fee will be payable.

## General Contact

University College Cork  
Department of Civil and Environmental Engineering  
Chair IT in AEC, Professor Karsten Menzel  
Tel: 00353-21- 420 5400  
Fax: 00353-21- 420 5450  
Email: k.menzel@ucc.ie

Marguerite Reardon,  
Executive Assistant to Prof. Karsten Menzel  
Western Gateway Building, 2<sup>nd</sup> floor, Room 2.12  
Tel: 00353-21- 420 - 5400  
Fax: 00353-21- 420 - 5450  
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MEngSc. Information Technology in  
Architecture, Engineering and Construction

1<sup>st</sup> term

# Foundations & Business Context

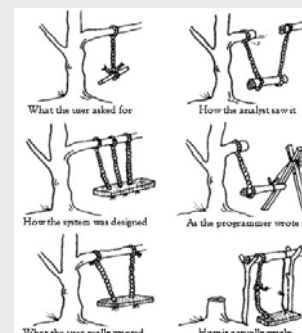
## CE6011 <sup>c)</sup> Software Engineering

**WHY ?** Engineers in the 21<sup>st</sup> century are required to design Complex Systems. They must manage and exchange information with multiple stakeholders.

This module delivers fundamental knowledge about the Software Life Cycle. Course participants develop an understanding of how Engineers can contribute to software development by efficiently collaborating with IT-specialists using standardised methodologies.

**WHAT ?** CE6011 Software Engineering consists of lectures and seminars. Students are expected to work on a small assignment focusing on Requirements Analysis and Systems Design with UML – these are the tasks usually performed by Engineers in Software Development projects.

Continuous Assessment 40%, Written Exam 60%.



## CE6012 <sup>c)</sup> Computer Aided Facilities Management

**WHY?** Up to 80% of building-related costs are spent during the operational phase. This module explains how Information Technology is used to support the efficient operation and management of buildings.

The three fundamental pillars of Computer Aided Facility Management (CAFM) are discussed: Technical Facility Management (FM), Infrastructural FM, and Commercial FM.

**WHAT?** Lectures, delivered by Dr. Morre, explain “step by step” the three pillars of CAFM. This is done using “life-demonstrations” of “real world examples”.

Seminars help students to refresh their skills in CAD and to further develop advanced skills on how to exploit and enrich CAD-models for CAFM-tasks.

Continuous Assessment 40%, Written Exam 60%.

## CE6014 <sup>e)</sup> Computer Mediated Communication

**WHY?** Engineers work in different environments; in the office, on site, in urban or rural environments. Therefore, they must have an in-depth understanding about the strength and limitations of different communication technologies.

A wide spectrum of technologies is addressed ranging from “Internet Protocols” to complex “Collaboration Tools” and “Knowledge Management Systems”.

**WHAT?** Lectures, delivered by Prof. Turk, introduce innovative IT-tools and methodologies required to support communication, collaboration and information exchange of distributed engineering teams. During their assignments students work on the development of an “IT-system architecture” for a possible CE-use case.

Continuous Assessment 100% (Essay).



## CE6015 <sup>e)</sup> Knowledge Management

**WHY?** The availability and easy accessibility of digital information is a competitive advantage in daily business. Most ‘engineering information’ is stored in simple file-formats (e.g. dwg, docx, xlsx).

However, it is essential to classify, categorise and structure this information to make it more easily accessible and ‘searchable’.

**WHAT?** Lecture, delivered by Dr. Tibaut, explains how information can be categorised and enriched with descriptive data in order to become valuable knowledge for engineers.

In their assignments students develop an ontology to make knowledge accessible through the Web.

Continuous Assessment 100% (Essay).

## CE6019 <sup>c)</sup> Building Diagnostics

**WHY?** The complexity of buildings and their technical systems increases. The failure of single components, such as sensors, valves, or pumps might have a significant impact on the efficiency of the operation of multiple systems. Therefore, engineers must know when and how to identify malfunctioning devices.

**WHAT?** The concept of Intelligent Buildings is explained and critically evaluated. Empirical methods for the (instrumented) acquisition of building performance data are introduced. The role of data fusion and data aggregation for facilities management tasks is explained.

Continuous Assessment 50%, Written Exam 50%.



## CE6029 <sup>c)</sup> IT for Energy in Buildings

**WHY?** Through the integration of renewable energy systems buildings can be turned from energy consumers (currently approx 40%) in ‘micro-generators’ integrated into ‘smart grids’.

Therefore, Engineers must have a detailed understanding how to model and how to control building energy systems by efficiently exploiting IT-systems in an integrated way.

**WHAT?** This module is a 10 credit module and runs over two terms. During the first term the module focuses on providing the fundamental knowledge on how to model energy systems in buildings.

Furthermore, hard and software platforms supporting the simulation and control of energy systems are introduced by Dr. Ploennigs from TU Dresden, Germany

Quizzes and short tests: 20% (continues in 2<sup>nd</sup> term).



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as per Calendar for the Academic Year 2015/2016: <sup>c)</sup> Compulsory course; <sup>e)</sup> elective course



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# 2<sup>nd</sup> term Specialisation and Projects

## CE6022 <sup>e)</sup> e-Business

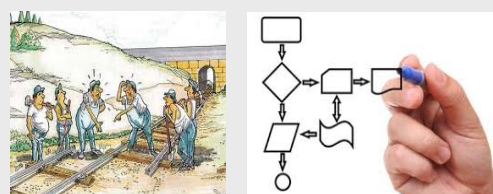
**WHY?** Engineers need detailed knowledge about how to analyse the performance of their business processes and how to manage Information in a "multi-dimensional way" for clients, sub-contractors and authorities.

**WHAT?** Lectures, delivered by Prof. Menzel, focus on "n-dimensional Data Management". In tutorials students learn how to develop a Data Warehouse and how to use DW-applications for data analysis. Continuous Assessment 40%, Written Exam 60%.

## CE6028 <sup>c)</sup> Information Modelling and Retrieval

**WHY?** Engineers work with different types of data. This data must be kept consistent and complete. Usually, it is stored and managed in so called Building Information Models. (BIM). BIM must support quick retrieval and efficient analysis of the data.

**WHAT?** Lectures and seminars focus on Building Information Modelling and the underpinning data exchange standards. Continuous Assessment 40%, Written Exam 60%.



## CE6016 <sup>e)</sup> Virtual Construction

**WHY?** The integration of information from multiple sources enables Engineers to get a much wider and in-depth understanding about both (1) the progress of a project during the construction phase and (2) the impacts of changes on the project's implementation.

**WHAT?** Lectures focus on the introduction of principles of 5D-CAD; integrating 3D-Building Information Models with scheduling and financial information. Tutorials focus on the usage of 5D-CAD software. Continuous Assessment 100% (Project).

## CE6018 <sup>e)</sup> Automation in Construction

**WHY?** The future of automated building includes mobile and ubiquitous computing in construction in order to make use of on-site robots and mobile construction factories.

**WHAT?** Students will be able to demonstrate knowledge in building tracking activities and in pre-fabrication methodologies for buildings and components. Continuous Assessment 100 marks.

## CE6021 <sup>c)</sup> Software Engineering

**WHY?** Engineers must have the practical experience to contribute to large-scale software development projects and to apply their knowledge in "real world" scenarios.

**WHAT?** Students participate in a software development project and will learn to work in different roles within a flexible team structure. Roles are allocated on a "rotational basis" (manager, analyst, developer, test engineer, etc.). Continuous Assessment 100 marks.

## CE6030 <sup>c)</sup> IT for Energy in Buildings

**WHY?** Proof of concept is important in Engineering. The concepts of "Continuous Commissioning" and "Post Occupancy Evaluation" are becoming very important for the design, operation and management of Smart Buildings. Additionally, there exist next legislative requirements for Energy Audits and regular inspection of building services systems.

**WHAT?** Students participate in a group project emphasising the usage of a complex software platform to support the design and evaluation of Building Energy Systems. Continuous Assessment 100 marks.



## CE6032 <sup>c)</sup> Work Placement

**WHY?** Academic knowledge is always deployed to the world of professional engineering. Graduates shall apply knowledge gained through academic study to the practice of engineering and learn to work effectively as part of an engineering team.

**WHAT?** Students broaden his/her engineering experience in a supervised structured work placement in an engineering organisation or research institute. Continuous Assessment 200 marks.

## CE6024 <sup>e)</sup> Finite Element Methods

**WHY?** Structures are deteriorating over their life-time. Resources to sustain infrastructural systems are limited. FEM is not only used to support the design of new systems; it is also used in combination with data analysis to determine the remaining life-span of built infrastructure systems.

**WHAT?** Lectures, delivered by Dr. Kelliher, deliver an in-depth understanding of FEM. They are complemented by seminars and tutorials which allow students to develop the required skill sets and expertise to apply FEM in daily engineering practice. Continuous Assessment 40%, Written Exam 60%.

## CE6025 <sup>e)</sup> Virtual Enterprises

**WHY?** The Engineers of the 21<sup>st</sup> century will contribute their specialist knowledge to multi-disciplinary teams. Therefore, it is essential to understand modern forms of collaboration from a contractual and managerial point of view. To understand, also, what ICT-support tools and technologies are available and how to customise them for different business scenarios.

**WHAT?** This module is divided in two parts; the first part gives an overview about novel, innovative business models used or introduced in Engineering and Facility Management, such as PPP or ESCO. The second part introduces ICT-infrastructures which are available to support these business scenarios, with an emphasis on Service Oriented Architectures. Continuous Assessment 100%

## CS 6312/CS6313 <sup>e)</sup> Mobile Systems Design

**WHY?** Mobile Hardware-Software platforms cover a broad spectrum from "ruggedized PDA" to "speech controlled, belt-worn computers with head mounted displays", each addressing specific use cases. Those Engineers who wish to contribute to the development and maintenance of specialised applications, such as systems for bridge inspectors, should attend these specialisation systems.

**WHAT?** Lectures and seminars, delivered by Dr. Grigoras, focus in the first term on providing the fundamental knowledge about hardware, operating systems and programming algorithms for mobile systems. Work in the 2<sup>nd</sup> term focuses on the development of application-oriented software. Continuous Assessment 40%, Written Exam 60%.



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MEngSc. Information Technology in  
Architecture, Engineering and Construction

# 3<sup>rd</sup> term Dissertation

## CE6031 <sup>c)</sup> Minor Research Dissertation

**WHY?** In response to the transformation of "Service Economies" in "Knowledge Economies" the Engineer of the 21<sup>st</sup> century must be capable (1) to identify research problems and formulate a related hypothesis on how to solve the problem; (2) carry out a critical literature review; (3) write and submit a well-structured thesis; and (4) demonstrate high ethical and engineering standards.

**WHAT?** After successful completion of the written exams students choose a research topic in consultation with their supervisor.  
This module provides students with an opportunity to apply their theoretical knowledge to a substantial problem in Information Technology and AEC requiring analytical and/or design and/or experimental effort.



### Dissertation Topics

#### Facility Management and Building Automation

Kieran O'Sullivan (2011)	Integrated IT-Architecture for Holistic Energy Management Development, Installation and Status Monitoring of Building Automation System
Afshin Cheraghi (2015)	Design, Development, Installation and Commissioning of Smart Buildings
Jimmy O'Sullivan (2015)	FMECA – Analogies for Energy Auditing Methodologies and Recommended Improvements
Manuel Arnold (2014)	Advanced Performance Data Management For HVAC-Units

#### Retrofit

Robert Flanagan (2011)	Façade Retrofit Using PV Technology as a Building Renovation Scenario
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#### Energy Systems

Michael Bell (2012)	Analysis & New Business Model for Energy Generation Concept on UCC's Campus
Sandra McSwiney (2015)	Analysis of Monitoring Data Aiming to Identify Devices and User Behavior Including Web-based Representation of Data and Results

#### Hydro Systems & Ports

John Fitzgerald (2013)	Dedicated Processing versus Cloud Computing – A Comparison of Different Model Processing Approaches to Hydro Systems Analysis
Mairead Rushe (2010)	RFID for Supply Chain and Maintenance Management in an Irish Port Scenario

#### Structural Analysis

Claire Atkins (2010)	Use of Integrated BIM-Tools for Detailed Structural Design and Analysis
Christopher Pires (2013)	Evaluation of the Craft Model for Nonlinear Concrete Behavior

#### Roads & Transport

Cormac O'Sullivan (2013)	Introduction of Electric Vehicles with PV Charging Facilities for UCC Campus
Maria Lynch (2009)	Development of an Integrated Software Architecture for Traffic Management Systems in a Medium-Sized Irish City
Aonghus O'Keeffe (2009)	Efficiency Gains in the Design and Construction of Roads and Bridges Using Product Modelling Techniques

#### Construction Management

Howard McDonagh (2010)	Deployment of a Mobile RFID System to Support Continuous Commissioning and FM
Alan Taaffe (2009)	Effective Project Collaboration through Virtual Construction

### Selected International Mentors

Prof. Ziga Turk	University of Ljubljana, Slovenia
Prof. Matevz Dolenc	University of Ljubljana, Slovenia
Prof. Andrej Tibaut	University of Maribor, Slovenia
Dr. Alan Hore	CITA, Dublin
Prof. Timo Cerovsek	University of Ljubljana, Slovenia
Prof. Danijel Rebolj	University of Maribor, Slovenia
Dr.-Ing. Joern Ploennigs	IBM Dublin
Dr. Stella Oggianu	United Technologies Research, USA
Frank Katzemich	Bilfinger HSG Facility Services, Germany
James Byrne	SIRUS, Building Energy Solutions
Dr. Matthias Schuss	Technical University Vienna, Austria
Dr. Alain Zarli	CSTB, France







MEngSc. Information Technology in  
Architecture, Engineering and Construction

# International Lecturers

## Ass. Prof. Matevz Dolenc



Dr. Dolenc is an Associate Professor, at the Chair of Construction Informatics, Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia. His research interest is in Engineering Collaboration and High-Performance Computing.

Dr. Dolenc received a PhD from the University of Ljubljana in 2001. He has contributed to many national and European Research projects, such as ICE4RISK or IntelliGrid

## Dr. Dan Grigoras



Dan is a Senior Lecturer at the Computer Science Department, UCC. He set up the Mobile and Cluster Computing Group. Currently, he coordinates the MSc on Mobile Networking and Computing, and the work placement programme of this department.

Dr. Grigoras graduated from Technical University of Iasi, Romania, Electrical Engineering, in 1981 and received a PhD from Politehnica University, Bucharest, Romania, in 1994. He was appointed as a Professor at University of Iasi in Sept 2001 and subsequently joined UCC's, e Computer Science Dept, in 2001.

## Dr. Dennis Kelliher



Dr. Kelliher is a Lecturer in the Department of Civil and Environmental Engineering at University College Cork, Ireland. His research interest is in Structural Shape Optimisation, Finite Element Analysis, Programming, IT in the AEC industry.

Dr. Kelliher is a graduate of the National University of Ireland Cork: BE (Civil) 1989 and PhD 1999. He worked for Ove Arup in Cork. He returned to UCC as a graduate student and then spent 6 months in the University of California, Berkeley. Upon his return in June 1994 he took up a lectureship. Denis is a Chartered Engineer and Member of the Institute of Engineers of Ireland (C.Eng M.I.E.I.)

## Prof. Ardeshir Mahdavi



Prof. A. Mahdavi is the director of the Department of Building Physics and Building Ecology, Institute of Architectural Sciences, Vienna University of Technology. His research foci include building physics (energy and thermal systems, acoustics, illumination engineering), building ecology and sustainable architecture, building service systems and building automation, building performance simulation and human ecology.

Prof. Mahdavi was from 1994 to 2001 a tenured full Professor of Architecture and Building Physics at the School of Architecture, Carnegie Mellon University (CMU), Pittsburgh, Pennsylvania, USA. Prof. Mahdavi has published over 300 contributions in peer-reviewed scientific journals and conference proceedings.

## Prof. Karsten Menzel



Prof. Menzel is a Professor for IT in AEC at University College Cork, Ireland. He has contributed to the design & implementation of multiple software systems, such as

- Virtual Reconstruction of the Walkenried Monastery,
- Progress Monitoring using Mobile Computers,
- Errors and Omissions Management,
- ITOBO – Platform for Optimised Building Operation.

Prof. Menzel's research interest is in Information Modelling, Data Analysis, Energy and Facilities Management, Ubiquitous Computing and RFID-Technology. He has published more than 100 publications. Prof. Menzel is a member of multiple professional organisations and represents UCC in the Engineering Committee of the Royal Irish Academy.

## Adjunct Professor Eckhart Morre



Prof. Morre is the Managing Director of Bilfinger HSG Facility Management GmbH (Frankfurt, Neu Isenburg, Germany). He was appointed Adjunct Professor at UCC in 2015. He has been the main contact for numerous joint research projects between University College Cork and Bilfinger HSG Facility Management International since 2007. His research interest is in applied data analytics and business process modelling.

Prof. Morre studied Physics and Philosophy at the University of Hamburg (Germany) from 1986 to 1992. He holds a PhD from the Instituto Balseiro, Universidad de Cuyo, S.C. de Bariloche, Argentina. Before joining Bilfinger he worked in different research and management positions at the Max Planck Institute for Chemical Physics of Solids (Dresden, Germany) and Roland Berger Consulting (Munich, Germany).

## Prof. Danijel Rebolj



Professor Rebolj is Professor for Construction Informatics at the University of Maribor. He was a Visiting Professor at Stanford University, CA (USA), the University of Novi Sad, Serbia and University College Cork. His research interest is in robotics, Automation in Construction, Virtual Design and Mobile and Ubiquitous Computing.

Prof. Rebolj received his primary degree in Civil Engineering and a Masters in Computer Science from the Univerza Mariboru, Slovenia in 1982 and 1989 respectively.

He progressed as a post-graduate researcher at the University of Graz, Austria and was awarded his PhD in Construction Informatics in 1993.

## Ass. Prof. M. Schuss



Professor Schuss is an Assistant Professor at the Department of Building Physics and Building Ecology, Institute of Architectural Sciences, Vienna University of Technology. His research includes energy, thermal systems, building service systems, building automation, and building performance analysis and simulation.

Professor Schuss received a Ph.D. (Dr. techn.) in Architecture from Vienna University of Technology in 2006. He has a primary degree in Civil Engineering and Construction Management (2006) from FH Campus Vienna and a degree in Computer Science (2004) from Vienna University of Technology, Austria.

## Ass. Prof. Andrej Tibaut



Dr. Andrej Tibaut is the Chair for Civil and Transportation Engineering at the University of Maribor, Slovenia. His expertise is in Knowledge Management. He has designed and implemented IT-systems documenting the quality of service of public transportation in Slovenia. He also contributed to the EU-project inPro.

Dr. Tibaut is graduate of the University of Maribor (BSc 1993, MSc 1997, PhD 2002). Concepts for the interoperability of distributed systems, knowledge management, ontology specification, specification and modelling databases, modelling and process in the construction and transport, building information models (BIM).



MEngSc. Information Technology in  
Architecture, Engineering and Construction

# Tutors and Industry Experts

**Siyu Deng**  
MEngSc.



Siyu is a contract researcher in the EU-FP7 project Baas. His professional background is software engineering and database management. Siyu is interested in web and mobile applications, data management systems and smart building systems.

Siyu graduated with a double degree from Guilin University of Electronic Technology, China and University College Cork, Ireland in Computer Science (BSc. 2011) and from UCC in Information Technology in AEC (MEngSc. 2012)

**Andriy Hryshchenko**  
MEngSc.



Andriy is a contract researcher in the EU-FP7 project Baas working on his PhD in parallel. His research interests are in Continuous Commissioning, Building Management Systems, and maintenance management, with particular interest in high density of buildings' monitoring.

Andriy Hryshchenko received his primary degrees in Technology of Manufacturing (Hons) 2000, Agricultural Mechanisation (Hons) 2002 and a MEngSc. (IT in AEC) from UCC in 2007. Andriy has published numerous papers in different Conference Proceedings and two book chapters.

**Sandra Mc Sweeney**  
MEngSc., BEng (Hons)



Sandra is an Assistant Engineer and Energy Officer at Kerry County Council. Her role involves the management of the Councils energy consumption and management of energy upgrade projects within the Local Authority. Before joining the Council Sandra worked as an Energy Engineer at the Tipperary Energy Agency. She also has work experience in Structural Engineering with Malachy Walsh & Ptns.

and Consulting Engineers in London where she worked on structural design of large scale mix use buildings.

Sandra initially received a first class BE (Hons) in Civil and Environmental Engineering and holds a MEngSc. in Information Technology in Architecture, Engineering, and Construction (distinction) both from University College Cork.

**Dr.-Ing.**  
**Joern Ploennigs**



Dr. Joern Ploennigs is a Senior Researcher at the IBM Research Centre, Dublin, Ireland. He worked as a Post-Doctoral Researcher with IRUSE, UCC in 2009/2010 funded by a Feodor Lynen Scholarship from the prestigious Alexander von Humboldt Foundation. Joern has authored more than 30 publications in books, journals and conference proceedings.



Dr. Ploennigs received his primary degree from the Dept. of Electrical Engineering, TU Dresden, Germany and completed his Master Thesis with Siemens AG in 2001. Joern progressed with his post-graduate studies and received a PhD in Electrical Engineering from TU Dresden in 2007 before joining IBM Dublin in 2012.

**Willy O'Reagan**  
MEngSc.



Willy O'Reagan is employed as an engineer with Gas Networks, Ireland, Cork. His professional background is civil engineering. Willy is interested in business process modelling, project and maintenance management.

Willy completed his MEngSc. In IT in AEC in 2012. During his MEngSc, Willy extended his knowledge, skills and expertise in Business and Business Process Modelling.

**Dr. Michal Otreba**



Dr. Michal Otreba is a senior engineer and BIM-coordinator at RPS-consulting in Cork, Ireland. He graduated from University College Cork with a PhD in Sustainable Design of Intelligent Facades 2014. Michal contributes as lecturer and tutor to modules CE2009, and CE6016.

Michal graduated with a BEng. (Hons) in Civil and Environmental Engineering from the University of Gdansk, Poland in 2004 and completed his MEngSc. in IT in AEC in 2009. Before Michal joined UCC in 2008 he worked in the construction sector.

**Sean Sirr**  
MSc., BEng (Hons)



Sean is an researcher in residence at IRUSE, Cork working for Bilfinger HSG Facility Management International (Frankfurt/Dublin). Currently, Sean works on his PhD-Thesis with a focus on innovative business models and procurement schemes for building energy ICT. Previously, Sean contributed to the EU FP7 project CAMPUS21. Sean delivers tutorials for CE6025 and CE6012 Computer Aided Facilities Management.

Sean graduated from QUB Civil Engineering in 2002 and entered the construction industry in the UK and Ireland as an engineer and manager on heavy civil road and rail bridge projects as well as some airport and large drainage projects. In 2009 Sean became an energy adviser on the HALO project and returned to complete his Masters in Environmental Systems in 2011. Sean is a member of Engineers Ireland.