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Uddannelse

1994 -

Through the years I have received a couple of courses within management and leadership and I also received a two year course in the theory of education. As a researcher the continuous learning process is an essential part of the job.

1994 - Ph.D. Degree, Title of Thesis: Multidynamic Design of Cross-roads.

1994 - HD, Graduate Diploma in Commerce at Aalborg University. (<http://www.evu.aau.dk/hd/>)

1987 - Master of Science degree in Civil Engineering at Aalborg University. (<http://www.civil.aau.dk/>)

Ansættelser

2008 -

Director of the Centre for 3D GeoInformation. (<http://www.3dgi.dk>).

After Lars Bodum had directed this lab since its start in 2001 he chose to be vice head in our department which gave me the opportunity to succeed him. At the moment the number of staff members is increasing due to project funding's. Please visit the centres own web page for more information.

2000 - 2007

Director of the VR Media Lab. (<http://www.vrmedialab.dk>).

I have been directing the VR Media Lab trough 8 years. The Lab was primarily a facilitator for research and exploration within the domain of virtual reality. When the lab was inaugurated it held the largest collection of VR related equipment like a 6-sided CAVE and a Panorama. For more information about the lab please use the link provided in the headline.

1997 -

Associate Professor in road design and GIS. Teaching road design and GIS on different semesters. In the field of GIS I focused on basic GIS-skills and grid-based GIS whereas the research part is focusing on 3D GIS.

1994 - 1997

Assistant Professor in road design at Aalborg University. Teaching road design and CAD in general. During my Ph.D. studies and the period as an assistant professor I focused more and more on the use of GIS and 3D modelling. I left the area of core road design as a research field during this period.

1991 - 1994 Ph.D. Student at Aalborg University. In the same period I did a lot of teaching and worked as a consultant for the Consulting company Rambøll and for the County of North Jutland. My consultancies were given in regards to the Novapoint CAD system and geometrical road design.

1989 - 1991 Secondary to my work at the County of North Jutland I worked as a teaching assistant in road design at Aalborg University.

1988 - 1991 Working as a civil engineer with road design at the County of North Jutland. I designed and carried out all kinds of projects from small bicycle lanes through

cities and open land areas to 4 lane highways. A lot of the assignments were adjustments of existing roads ex. widening the road or mending curved alignments. I also designed a lot of cross-roads and roundabouts. During this period I started working with CAD for road design and 3D landscape modelling.

1982 - 1987 Study period at Aalborg University

Forskning

New project description are coming up soon

Energibyen Frederikshavn (2008- 2010)

InfraWorld (2008 – 2012)

<http://www.vianovsystems.no/Brukermoeter/Brukermoeter-2012/InfraWorld#.U-thDEgRV90>

My time in VR Media Lab (2000 – 2007)

Listed below you will find some major projects I have been involved in during my period at Aalborg University. During my time as a director of the VR Media Lab I have also been involved in a huge number of small and medium-sized projects where VR and 3D visualization has been the main focus. These projects have primarily been carried out together with the staff at VR Media Lab and private companies. Further these projects had the main purpose to try VR as new technology or media in a wide range of usage. Take a brief look here:

VR Media Lab / projects

Stålcentrum - RTC (2006 - 2008) Visualisering som kommunikationsværktøj mellem kunde og leverandør Projektet er finansieret af Videnskabsministeriet og bliver ledet af Teknologisk Institut i Kolding. Delprojektet som jeg deltager i fokuserer på visualisering af produktionsudstyr til fødevarerindustrien, idet vi benytter både Cave'n og Panoramaet til at visualisere de dele, der indgår i produktionen. Vi bruger visualiseringen som led i kommunikationen mellem udstyrsleverandøren og fødevarerproducenten. Herudover tager vi de første skridt til at optimere indretningen af arbejdspladsen, hvor denne er meget belastende for kroppen. Denne del er forarbejdet til en ansøgning i Højteknologifonden i 2007.

IT in the Building Industry (2004 - 2007)

VR Media Lab is part of a Consortium which contains of the major consulting engineering company Rambøll in Copenhagen as the lead contractor, Arkitema representing architects and coming from Århus and finally NCC representing the interests of the entrepreneurs. The consortium has the assignment to describe the demands of digital data within the building industry in a way that project data can be used all the way from the architectural competition over the consulting engineering part to the entrepreneur. The data should be able to handle 3d information and be identified as objects without being connected to any propriety software package.

The project is financed by 2/3 from the danish "Erhvervs- og Boligstyrelsen". Further information can be obtained from the following link: [Det digitale byggeri](#)

3D GeoInformation (2001 - 2006)

At the moment most of my research time goes to the 3d GeoInformation knowledge centre. This project was initiated in the late nine-tees and the application was granted in 2001.

In this centre we have an ongoing project where we want to build a platform and a virtual model of the world and in particular of North Jutland. This model is than supposed to be used as a new spatial visualization platform, where all kind of information and visual aspects like for instance planning issues can be presented.

The goal is to build a landscape model with all its features like buildings, vegetation etc. or at least as many features as possible. We want to be able to represent those features as objects in a database where it is possible to retrieve them again in real time. Together with the geometry of the objects it is possible to retrieve information which are connected to the features. The feature can be pointed at and selected in a 3d view on a display system. The system developed for that purpose goes under the name of GRIFINOR. GRIFINOR is a open source platform.

Even if the funding has stopped now the knowledge centre continuous. Please go to the web page for GRIFINOR for further information.

Earlier Work

3D Visualization for Decision-Making (2002 - 2005) In connection with the new "House of Music" in Aalborg the VR Media Lab has been involved in the decision-making process. All incoming projects have been visualized and presented in the Panorama following a well defined schema for the presentation. These visualizations where supposed to give an idea of the shape and volume of the different projects placed in the town model of Aalborg. After this process three projects where chosen for further negotiations and visualization work. So all three projects where modelled with the interior and again presented to the jury. Finally the winner was found.

Virtual Reality In Planning (1998 - 2002)Creating 3D-Models for the Purpose of Planning

Why can our children move around in artificial Worlds playing the conqueror of the world, driving hazardously through virtual cities or killing outrageous monsters in a castle without getting even a scratch? The market of computer-games is huge and the people behind have developed smooth techniques making it possible to move around in virtual

environments with very high refresh-rates between the computer-generated pictures. In the field of urban and regional planning or civil engineering 3D-modelling and animations have been produced in big numbers through the years. But it is very expensive and time-consuming building a good computer-model. Moving to virtual reality makes it even harder to use these techniques. This project faces the problems of building a good 3D-model, gives some ideas of how it can be done much easier and present a piece of software where these ideas have been implemented. This work shows that it is possible with very little 3D-modelling knowledge to use virtual reality as a tool in a planning process.

Road-Pricing (1998 - 2001)

At DTU in Copenhagen a big road-pricing project started early 1998. The project had the goal to develop a road pricing system different from those used world wide where you pay at a toll-ring at the outskirts to the inner city or simply for using a highway. The road-pricing system in this project calculates a price for every meter you drive on a specific road, which is divided into several price classes. I.e. driving on a highway in an open area is very much cheaper than driving in the inner city on a local road. This pricing system has the ability to control traffic around the city much more precise and hopefully convince as many as possible to use public transport instead of using private cars from and to work in the cities, or at least getting the motorist using major ways instead of the ways in the inner cities. At Aalborg University a prototype has been developed during spring 1999, which basically is a portable PC with a GPS attached giving the co-ordinates in the GIS system which is the heart of the system. In the GIS system the calculations will be done while the GPS is the positioning system which can be exchanged with another technology anytime. The prototype area is the city of Aalborg. The System was then: Toshiba Satellite Pro 490XCDT (PII 266, 160Ram), Trimble GPS NAV-GUIDE+, ArcView 3.1 and Tracker Analyst for ArcView. (About 4000\$ all together). The prototype has been developed by Jesper Kruse during spring 1999, who wrote his master about this prototype to become a chartered surveyor. His diploma work can be downloaded at road-pricing.pdf (2,6Mb, only in Danish). This project has been going on since then. New dedicated boxes with cpu and gps included have been developed and other functionality like speed control has been implemented. For more information look here: TRG

Publikationer

Software Tools Supporting Advanced Design Requirements for Digital Twins

Kjems, E. & Arthur, J. K., 2021, *Proceedings of the 38th International Conference of CIB W78, Luxembourg, 13-15 October*. Kubicki, S. (red.). ITC, s. 214-223 22. (Proceedings of the 37th International Conference of CIB W78; Nr. 2021, Bind w78).

Vejsektoren 4.0

Kjems, E., 2019, I: *Trafik & Veje*. 96, 12, s. 39-41

Augmented Reality er kommet til vejsektoren

Kjems, E. & Hansen, L. H., 2018, I: *Trafik & Veje*. 8, August, s. 58-61 9029.

Energy-efficient cruise control – a pre-project study

Kjems, E., Bolet, L., Agerholm, N. & Plausinaitis, D., 2016, *Proceedings of 11th ITS European Congress, Glasgow, Scotland, 6-9 June 2016*. ITS European Congress, 11 s.

BIM i vejsektoren

Kjems, E., maj 2015, I: *Trafik & Veje*. 5, s. 12-15 4 s.

Undlad spild af god plads

Kjems, E., Frederiksen, A. B. & Bolet, L., 2015, I: *Trafik & Veje*. 91, 9, s. 52-55 4 s.

A 3D City Model as User Interface Connected to an Energy Model

Kjems, E. & Østergaard, P. A., 2014, *Technologies for Urban and Spatial Planning: Virtual Cities and Territories*. Pinto, N. N., Tenedório, J. A., Antunes, A. P. & Cladera, J. R. (red.). IGI Global, s. 228-246 19 s.

A 3D City Model with Dynamic Behaviour Based on Geospatial Managed Objects

Kjems, E. & Kolář, J., 2014, *Innovations in 3D Geo-Information Sciences*. Isikdag, U. (red.). Springer, s. 159-173 15 s. (Lecture notes in geoinformation and Cartography).

Data fusion using geographic managed objects

Kjems, E., 2014, *eCAADe 2014: Fusion - Data Integration at its best: Proceedings of the 32nd International Conference on Education and research in Computer aided Architectural Design in Europe*. Thompson, E. M. (red.). Newcastle: eCAADe, Bind 2. s. 495-504 9 s.

Geodata til mere end kort

Kjems, E., 2014, I: Geoforum Perspektiv. 24, s. 54-59 6 s.

Energieffektiv fartpilot

Kjems, E., Bolet, L., Plausinaitis, D. & Staunstrup, J. K., 2013, Institut for Planlægning, Aalborg Universitet. 69 s. (ISP-Skriftserie; Nr. 02).

Prototyping a sensor enabled 3D citymodel on geospatial managed objects

Kjems, E. & Kolář, J., 2013, *ISPRS 8th 3D GeoInfo Conference & WG II/2 Workshop (Volume II-2/W1) 27-29 November 2013, Istanbul, Turkey: ISPRS Annals*. Isikdag, U. (red.). Istanbul: International Society for Photogrammetry and Remote Sensing, Bind 2. s. 187-192 6 s.

The World of Geographically Referenced Information is Facing a Paradigm Shift

Kjems, E., 20 mar. 2011

A 3D City Model Used as User-interface for an Energy-System

Kjems, E. & Wen, W., 2011. 9 s.

A 3D City Model Used as User-interface for an Energy-system

Kjems, E., 2011, *12th International Conference on Computers in Urban Planning and Urban Management : Book of Abstracts*. Hunt, J. D. & Abraham, J. (red.). Alberta: University of Calgary, s. 37-37 1 s.

InfraWorld

Kjems, E., 2011, I: Trafik og Veje. 06/07, s. 44-47

Real world 3D modelling

Kjems, E., 2010, I: Public Service Review. European Union. 20, s. 300-300

Managed Objects for Infrastructure Data

Kjems, E., Bodum, L. & Kolar, J., 2009, *3D Geo-Information Sciences*. Lee, J. & Zlatanova, S. (red.). Berlin Heidelberg: Springer, s. 97-107 (Lecture notes in geoinformation and cartography).

Object Oriented Visualization of Urban Energy Consumption

Kjems, E. & Bodum, L., 2009, *Proceedings of 11th conference on Computers in Urban Planning and Urban Management*. Anthony G. O., Y. & Zhang, F. (red.). ESRI Press, 12 s.

Object oriented roads in modelmaps

Kjems, E. & Kolar, J., 2008, *CUPUM 2007: Book of abstracts*. Nelson Rodrigues da Silva, A. & Lucas de Souza, L. C. (red.). University of São Paulo, 9 s.

Virtual Reality for training and collaboration in emergency management

Kjems, E. & Bodum, L., 2008, *Geospatial Information Technology for Emergency Response*. Zlatanova, S. & Li, J. (red.). London: Taylor & Francis, s. 203-216 (International Society for Photogrammetry and Remote Sensing (ISPRS) Book Series, Bind 6).

Spatial object structure for handling 3D geodata in GRIFINOR

Kjems, E. & Kolar, J., 2006, *Innovations in 3d geo information systems*. Abdul-Rahman, A., Zlatanova, S. & Coors, V. (red.). IEEE Computer Society Press, s. 107-118 (Lecture notes in geoinformation and cartography).

3d geodata er til mere end billeder

Kjems, E., 2005, I: Dansk Vejtidsskrift. 82, 8, s. 44-45

From mapping to virtual geography

Kjems, E. & Kolar, J., 2005, *CUPUM '05: Computers in Urban Planning and Urban Management : Abstracts of the 9th International Conference, London 2005*. Batty, S. E. (red.). Center for Advanced Spatial Analysis, University College London, s. 326

VR applications in an architectural competition: Case: House of Music in Aalborg

Kjems, E., 2005, *Realitat Virtual a l'Arquitectura i la Construcció: Taller 2*. Khora II, s. 47-58

Videncenter for 3D GeoInformation

Kjems, E. & Bodum, L., 2003, I: *Tidsskrift for Kortlægning og Arealforvaltning*. 41, 1-03, s. 63-68

Virtual Reality efter CAD

Kjems, E., 2003, I: *cadmagasinet*. 18, s. 11-14

Constructional Aspects of Virtual Space: introduction

Kjems, E. & Madsen, C. B., 2002, *Virtual Space*. Qvortrup, Lars (ed.) (red.). London: Springer

Introduction [Section 2 Constructional Aspects of Virtual Space]

Kjems, E. & Madsen, C. B., 2002, *Virtual Space : Spatiality in Virtual Inhabited 3D Worlds*. Qvortrup, L. (ed.) (red.). London: IEEE Computer Society Press, s. 73-74

VR for decision support in urban planning

Kjems, E., 2001, *CUPUM 2001 Proceedings from the 7th International Conference on Computers in Urban Planning and Urban Management*. University of Hawaii

Er tiden inde til at tage det næste skridt ind i VR verdenen? lederartikel

Kjems, E., 2000, I: *Dansk Vejtidsskrift*. 77, 5, s. 2-

Creating 3D-models for the purpose of planning

Kjems, E., 1999, *CUPUM 1999 Proceedings from the 6th International Conference on Computers in Urban Planning and Urban Management*. Rizzi, Paola (ed.) (red.). Istituto Universitario di Architettura de Venezia

Digital projektering

Kjems, E., 1998, *Veje og stier*. Thagesen, B. (red.). Lyngby: Polyteknisk Boghandel og Forlag, s. 264-278

Multi-Dynamic Design Method

Kjems, E., 1998, *Computers in Urban Planning and Urban Management*. Sikdar, P.K. : Dhingra, S.L. : Krishna Rao, K.V.(eds.) (red.). s. 13

Tracering

Kjems, E., 1998, *Veje og stier*. Thagesen, B. (red.). Lyngby: Polyteknisk Boghandel og Forlag, s. 149-173

Raster-GIS for Route-Planning

Kjems, E., 1997, *Athens International Conference Urban Regional Environmental Planning and Informatics to Planning in an Era of Transition, 22-24 October 1997 : Proceedings*. Sellis, Timos : Georgoulis, Dimitri (eds.) (red.). Technical University

Tracering og digital projektering

Kjems, E., 1997, *Vejteknik : Kompendium*. Thagesen, Bent (red.) (red.).

Raster-GIS i vejplanlægning

Kjems, E. & Forsberg, A., 1996, I: *Tidsskrift for Kortlægning og Arealforvaltning*. 105, 38, s. 212-221

Raster-GIS i vejplanlægning

Kjems, E., 1996, *Trafikdage på Aalborg Universitet'96*. Lahrmann, Harry : Pedersen, Leif Hald (red.) (red.). Institut for Samfundsudvikling og Planlægning, Aalborg Universitet, Bind 2. s. 673-687 (ISP-Skriftserie; Nr. 188).

Multi-Dynamic Design Method

Kjems, E., 1995, *SCANGIS'95 : The 5th Scandinavian Research Conference on Geographical Information Systems*. Bjørke, Jan Terje (ed.) (red.). Norway, s. 1-10

Brugervejledning til vejprojektering i NovaCAD

Kjems, E., 1994, Aalborg: Institut for Samfundsudvikling og Planlægning, Aalborg Universitet. (ISP-Skriftserie; Nr. nr. 108).

Cyklisters sikkerhed i kryds

Kjems, E. & Lahrmann, H., 1994, I: *Dansk Vejtidskrift*. Nr. 3, s. 12-14

Multidynamisk konstruktion af vejkryds

Kjems, E., 1994, Aalborg: Institut for Samfundsudvikling og Planlægning, Aalborg Universitet.

Multidynamisk konstruktion af vejkryds

Kjems, E., 1993, I: *Dansk Vejtidskrift*. 70, 12, s. 26-27

Vejprojektering i fremtiden

Kjems, E., 1992, I: *Dansk Vejtidskrift*. 69, 1, s. 20-22

Projekter

3D Visual Data Mining (3DVDM)

Stenholt, R. (Projektdeltager), Kjems, E. (Projektdeltager) & Granum, E. (Projektdeltager)
19/05/2010 → ...

3d visualisering og VR til beslutningsstøtte

Kjems, E. (Projektdeltager)
19/05/2010 → 19/05/2013

BLING: Bling - Blockchain in Government

Tsiulin, S. (Col (co-investigatør)), Reinau, K. H. (PI (principal investigatør)), Stakenaite, D. (Projektdeltager), Agerholm, N. (Col (co-investigatør)) & Kjems, E. (Col (co-investigatør))
01/01/2019 → 01/07/2023

Det Digitale Byggeri. Byggherrekrav - 3D modeller - B3D

Carlsen, M. (Projektdeltager), Christiansson, P. (Projektdeltager), Svidt, K. (Projektdeltager) & Kjems, E. (Projektdeltager)
02/02/2004 → 31/12/2006

InfraWorld

Kjems, E. (Kontaktperson), Kolar, J. (Projektdeltager), Bodum, L. (Projektdeltager), AS, V. (Projektleder), es, I. (Projektdeltager), AS, N. (Projektdeltager), Healthcare, V. (Projektdeltager), Kommune, D. (Projektdeltager) & SF, S. (Projektdeltager)
VERDIKT, under Norges ForskningsRåd
01/05/2008 → 01/05/2012

Integrated Project Development for Road Infrastructure Education

Øhlenschläger, R. (PI (principal investigatør)), Stakenaite, D. (Kontaktperson) & Kjems, E. (PI (principal investigatør))
01/09/2020 → 01/09/2023

Maritimt Block-Kraft

Tsiulin, S. (Col (co-investigator)), Reinau, K. H. (PI (principal investigator)), Agerholm, N. (Col (co-investigator)), Kjems, E. (Col (co-investigator)), Stakenaite, D. (Andet) & Karam, A. (Col (co-investigator))
08/04/2019 → 31/12/2020

Ny general datamodel til digitale infrastrukturdata

Kjems, E. (Projektdeltager), Overby, J. (Projektdeltager), Kolar, J. (Projektdeltager) & Ilsøe, P. M. (Projektdeltager)
19/05/2010 → 19/05/2013

Støtte til udarbejdelse af kursusgange om jernbane transport

Reinau, K. H. (PI (principal investigator)), Kjems, E. (Col (co-investigator)), Agerholm, N. (Col (co-investigator)) & Stakenaite, D. (Kontaktperson)
01/08/2019 → 30/06/2021

The Staging of Virtual Inhabited 3D Spaces

Bodum, L. (Projektdeltager) & Kjems, E. (Projektdeltager)
31/12/2003 → 31/12/2003

Videncenter for 3D GeoInformation

Kjems, E. (Projektdeltager), Sørensen, E. M. (Projektdeltager), Overby, J. (Projektdeltager), Nielsen, A. H. (Projektdeltager), Bodum, L. (Projektdeltager), Ilsøe, P. M. (Projektdeltager) & Kolar, J. (Projektdeltager)
01/09/2001 → 31/12/2005

Virtual Reality in Design, Construction and Operation

Svidt, K. (PI (principal investigator)), Jensen, R. L. (PI (principal investigator)), Kjems, E. (PI (principal investigator)), Hansen, L. H. (PI (principal investigator)) & Wyke, S. (PI (principal investigator))
COWIfonden
01/01/2017 → 30/09/2019

VR Media Lab, Virtual Reality Media Lab

Kjems, E. (Projektdeltager) & Granum, E. (Projektdeltager)
19/05/2010 → 19/05/2013