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Education

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.ev.u.aau.dk/hd/>)

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

Professional Occupation

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

Research

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

Publications

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Addressing the elephant in the underground: an argument for the integration of heterogeneous data sources for reconciliation of subsurface utility data

Hansen, L. H., van Son, R., Weiser, A. & Kjems, E., Oct 2021, *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. 4/W4-2021 ed. Vol. 46. p. 43–48 6 p. (International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences; No. 4/W4, Vol. Volume XLVI).

Smartphone-Bases Reality Capture for Subsurface Utilities: Experiences from water utility companies in Denmark

Hansen, L. H., Mandahl Pedersen, T., Kjems, E. & Wyke, S., Oct 2021, *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. Truong-Hong, L., Che, E., Jia, F., Emamgholian, S., Laefer, D. & Vo, A. V. (eds.). Vol. XLVI-4/W4-2021. p. 25–31 7 p. (International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences).

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Towards AR-enabled informed decision-making in subsurface utility projects through visualising 3D capture data of as-built utilities

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Nye teknologier til forebyggelse af graveskader - Anvendelse af Reality Capture og Augmented Reality

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Vejsektoren 4.0

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Augmented Reality er kommet til vejsektoren

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

Visualizing earthwork and information on a linear infrastructure project using BIM 4D

Jakobsen, L. S., Lodewijks, J., Gade, P. N. & Kjems, E., 2018, *eWork and eBusiness in Architecture, Engineering and Construction: Proceedings of the 12th European Conference on Product and Process Modelling (ECPPM 2018)*. Karlshøj, J. & Scherer, R. (eds.). London: CRC Press/Balkema, p. 177-186

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Internationalt samarbejde om BIM og digitale vejmodeller

Jensen, R. F. & Kjems, E., 2016, In: *Trafik & Veje*. 2, p. 38-40 3 p.

Pendlings sociale geografi – transportmiddelvalg i lyset af pendlerens politiske holdninger, sociale normer og kultur

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Rimme, N., Nielsen, L., Kjems, E., Tønning, C., Lahrmann, H. S. & Agerholm, N., 2016, *29th ICTCT Workshop in Lund, Sweden on 20th and 21st October 2016: How to assess traffic safety? - Adapting methods to future challenges - Book of abstracts*. Lund: International Co-operation on Theories and Concepts in Traffic Safety (ICTCT), p. 62 1 p.

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Undlad spild af god plads

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

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

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Kjems, E., 2014, In: Geoforum Perspektiv. 24, p. 54-59 6 p.

Energieffektiv fartpilot

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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. (ed.). Istanbul: International Society for Photogrammetry and Remote Sensing, Vol. 2. p. 187-192 6 p.

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

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Managed Objects for Infrastructure Data

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19/05/2010 → ...

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Kjems, E.

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