Henrik Bechmann

Organisations

Forskningsadjunkt, Department of Informatics and Mathematical Modeling
04/07/2003 → 07/04/2016 Former
VIP

Head of Studies Healthcare Technology, Associate Professor, PhD, Center for Bachelor of Engineering Studies
27/08/2012 → present
hebec@dtu.dk
VIP

Afdelingen for Informatik
17/01/2014 → present
VIP

Publications:

Smart Campus and Smart Transport

General information
State: Published
Organisations: Center for Bachelor of Engineering Studies, Afdelingen for Informatik
Authors: Schultz, O. (Intern), Pinholt, H. U. (Intern), Bechmann, H. (Intern)
Number of pages: 1
Publication date: 2016
Main Research Area: Technical/natural sciences
Links:
http://www.sustain.dtu.dk/

Bibliographical note
Sustain Abstract L-6
Publication: Research - peer-review › Conference abstract for conference – Annual report year: 2016

2011 Summer School on Healthcare Technology - HCT 2011
The aim of the course is introduction to biomedical, technological and health care application areas, which form the basis for the next generation of telemedicine systems.
The course consists of lectures from the medical, technological and industrial areas related to telemedicine and supplemented by visit at company working with healthcare technology. The course will also have hands-on programming sessions with sensor systems for measuring human physiological parameters.

Course keywords:
- Human physiology, anatomy and the large disease groups: Cancer, diabetes, blod wessel calcifications, heart diseases and chronic lung disease.
- Measuring human physiological parameters.
- Analysis of biomedical signals.
- Wireless systems as a tool for communicating measured human physiological parameters for clinical monitoring and rehabilitation, targeting telemedicine systems.
- Examples of existing and emerging medical and rehabilitation systems e.g. for clinical diagnosis and monitoring of the large disease groups, using telemedicine.

Course sessions, group work, project work, some course sessions hosted by int. company within healthcare technology and research group within telemedicine.

Combines the learning of new methods with the applications of these methods.

Semester: August 2011
Extent: 7.5 ects
Grey-box modelling of aeration tank settling

State: Published
Organisations: Department of Informatics and Mathematical Modeling, Mathematical Statistics
Authors: Bechmann, H. (Intern), Nielsen, M. K. (Ekstern), Poulsen, N. K. (Intern), Madsen, H. (Intern)
Pages: 1887-1895
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Water research
Volume: 36
Issue number: 7
Ratings:
BFI (2018): BFI-level 2
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 7.49 SJR 2.629 SNIP 2.558
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.689 SNIP 2.507 CiteScore 6.63
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.957 SNIP 2.727 CiteScore 6.13
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.956 SNIP 2.693 CiteScore 6.02
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.966 SNIP 2.456 CiteScore 5.15
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 2.867 SNIP 2.374 CiteScore 5.43
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.582 SNIP 2.196
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.319 SNIP 2.225
Web of Science (2009): Indexed yes
Grey Box Modelling of First Flush and Incoming Wastewater at a Wastewater Treatment Plant

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling, Mathematical Statistics
Authors: Bechmann, H. (Intern), Madsen, H. (Intern), Poulsen, N. K. (Intern), Nielsen, M. K. (Ekstern)
Pages: 1-12
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Environmetrics
Volume: 11
ISSN (Print): 1180-4009
Ratings:
BFI (2018): BFI-level 1
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.944 SNIP 1.045 CiteScore 1.59
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.014 SNIP 0.892 CiteScore 1.48
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.061 SNIP 1.178 CiteScore 1.64
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.073 SNIP 1.228 CiteScore 1.65
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Grey-box Modelling of Pollutant Loads From a Sewer System

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling, Kryger
Authors: Bechmann, H. (Intern), Nielsen, M. K. (Ekstern), Madsen, H. (Intern), Poulsen, N. K. (Intern)
Pages: 71-78
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Urban Water
Volume: 1
Ratings:
Scopus rating (2005): SJR 1.111 SNIP 3.025
Scopus rating (2004): SJR 0.518 SNIP 1.426
Scopus rating (2003): SJR 0.592 SNIP 1.787
Scopus rating (2002): SJR 0.505 SNIP 0.792
Scopus rating (2001): SJR 0.257 SNIP 0.461
Scopus rating (2000): SJR 0.178 SNIP 0.11
Original language: English
Source: orbit
Source-ID: 173062
Publication: Research - peer-review › Journal article – Annual report year: 1999
Modelling of wastewater systems
In this thesis, models of pollution fluxes in the inlet to 2 Danish wastewater treatment plants (WWTPs) as well as of suspended solids (SS) concentrations in the aeration tanks of an alternating WWTP and in the effluent from the aeration tanks are developed. The latter model is furthermore used to analyze and quantify the effect of the Aeration Tank Settling (ATS) operating mode, which is used during rain events. Furthermore, the model is used to propose a control algorithm for the phase lengths during ATS operation. The models are mainly formulated as state space model in continuous time with discrete-time observation equations. The state equations are thus expressed in stochastic differential equations. Hereby it is possible to use the maximum likelihood estimation method to estimate the parameters of the models. A Kalman filter is used to estimate the one-step ahead predictions that are used in the evaluation of the likelihood function. The proposed models are of the grey-box type, where the most important physical relations are combined with stochastic terms to describe the deviations between model and reality as well as measurement errors. The pollution flux models are models of the COD (Chemical Oxygen Demand) flux and SS flux in the inlet to the WWTP. COD is measured by means of a UV absorption sensor while SS is measured by a turbidity sensor. These models include a description of the deposit of COD and SS amounts, respectively, in the sewer system, and the models can thus be used to quantify these amounts as well as to describe possible first flush effects. The buildup and flush out of the deposits are modelled by differential equations, thus the models are dynamic models. The dynamic models are furthermore compared to simpler static models and it is found that the dynamic models are better at modelling the fluxes in terms of the multiple correlation coefficient R2. The model of the SS concentrations in the aeration tanks of an alternating WWTP as well as in the effluent from the aeration tanks is a mass balance model based on measurements of SS in one aeration tank and in the common outlet of all the aeration tanks, respectively. This model is a state space model with the SS concentrations and the sludge blanket depths in the aeration tanks as state variables and with the SS concentrations in one aeration tank and in the common outlet as observations. The SS concentration model is used to quantify the benefits of ATS operation in terms of increased hydraulic capacity. The model is furthermore used to propose a control algorithm for the phase lengths during ATS operation. The quantification of the benefits of ATS operation as well as the proposal for a control algorithm is based on the assumption that if the SS concentration in the secondary clarifier increases beyond a plant and situation specific amount above the normal dry weather level, the SS concentration in the effluent increases to an unacceptable level. It was found that ATS increases the hydraulic capacity of the WWTP considered by more than 167%, while the proposed control algorithm is yet to be implemented in full scale.

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling
Authors: Bechmann, H. (Intern)
Number of pages: 161
Publication date: 1999

Publication information
Place of publication: Lyngby
Publisher: Department of Mathematical Modelling, Technical University of Denmark
Original language: English
Series: IMM-PHD-1999-69
Main Research Area: Technical/natural sciences
Electronic versions:
imm2498.pdf
imm2498.ps
Source: orbit
Source-ID: 200766
Publication: Research › Ph.D. thesis – Annual report year: 1999

Control of Sewer systems and Wastewater treatment plants using pollutant concentration profiles
On-line measurements of pollutants in the wastewater combined with grey-box modelling are used to estimate the amount of deposits in the sewer system. The pollutant mass flow at the wastewater treatment plant is found to consist of a diurnal profile minus the deposited amount of pollutants. The diurnal profile is found to be a second order harmonic function and the pollutants deposited in the sewer are identified using first order ordinary differential equations.

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling, Mathematical Statistics
Authors: Bechmann, H. (Intern), Nielsen, M. K. (Ekstern), Madsen, H. (Intern), Poulsen, N. K. (Intern)
Pages: 87-93
Publication date: 1998
Main Research Area: Technical/natural sciences
Grey-Box Modelling of pollutant Loads from the Sewer System for Control of Equalisation Basins

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling, Mathematical Statistics
Authors: Bechmann, H. (Intern), Nielsen, M. (Ekstern), Madsen, H. (Intern), Poulsen, N. K. (Intern)
Pages: 773-780
Publication date: 1998

Host publication information
Title of host publication: the Fourth International Conference on Developments in Urban Drainage Modelling (UDM’98), London, UK
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 199966
Publication: Research - peer-review › Article in proceedings – Annual report year: 1998

Adaptive Optimization of the indicated efficiency in spark ignition engines

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling, Mathematical Statistics, Automation, Department of Electrical Engineering
Authors: Bechmann, H. (Intern), Poulsen, N. K. (Intern), Hendricks, E. (Intern)
Publication date: 1992

Publication Information
Publisher: Institute of Mathematical Statistics and Operations Research (IMSOR), The Technical University of Denmark
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 200882
Publication: Research - peer-review › Report – Annual report year: 1992

Projects:

Big Data Applications in Energy Optimization, Smart City and Agriculture
Goal of the project is to bring together employees, external partners and students in the exploitation of Big Data applications in a number of fields:
- Energy optimization (saving of energy)- Smart city (traffic monitoring)- Agriculture, weeding (automated mechanical weeding)- Agriculture, weather forecast (weather stations)
In all the cases Big Data from many sensors, including historical data, can be applied in data fusion algorithms in the search for more efficient and cheaper solutions. The exploitation will end up in the definition of new research projects and possibly the submission of project proposals for attracting externals funds, e.g., Horizon 2020 proposals.

Center for Bachelor of Engineering Studies
Afdelingen for Informatik
Afdelingen for El-teknologi
Period: 01/01/2017 → 01/01/2018
Number of participants: 7
Diplomingeniøruddannelse i Sundhedsteknologi
Udvikling af Diplomingeniøruddannelse i Sundhedsteknologi.

Relations:
Activities: Sundhedsteknologi - metoder, praksis og perspektiver

Center for Bachelor of Engineering Studies
Center for Information Technology and Electronics
Department of Electrical Engineering
Department of Applied Mathematics and Computer Science
Center for Continuing Education
Office for Study Programmes and Student Affairs
Center for Business and Innovation
Period: 01/05/2008 → 31/12/2012
Number of participants: 13

Sundhedsteknologi, Telemedicin, Nye teknologiske platforme

Project participant:
Sørensen, John Aasted (Intern)
Baden-Kristensen, Keld (Intern)
Holst-Christensen, Bo (Intern)
Sørensen, John Kryger (Intern)
Munck-Fairwood, Roger (Intern)
Bechmann, Henrik (Intern)
Hauge, Anders (Intern)
Olesen, Per (Intern)
Jeppesen, Lau (Ekstern)
Tolstrup, Jytte (Ekstern)
Pilegaard, Marianne (Ekstern)

Working partner:
Lausten, Anette Kjeldal (Ekstern)
Besenbacher, Bente (Ekstern)

Financing sources
Source: Internal funding (public)
Name of research programme: Ingeniørhøjskolen i København
Amount: 1,200,000.00 Danish Kroner

Identification og regulering af rensningsanlæg
Department of Informatics and Mathematical Modeling

Krüger A/S
Period: 01/05/1996 → 30/04/1999
Number of participants: 4
Project participant:
Poulsen, Niels Kjølstad (Intern)
Bechmann, Henrik (Intern)
Nielsen, Marinus (Ekstern)
Project Manager, organisational:
Madsen, Henrik (Intern)

Financing sources
Source: Unknown
Name of research programme: Unknown
Amount: 36,175.00 Danish Kroner

Modellering og Prædiktiv Styring af Spildevandssystemer

Department of Informatics and Mathematical Modeling
Period: 01/05/1996 → 28/04/2000
Number of participants: 3
Phd Student:
Bechmann, Henrik (Intern)
Supervisor:
Poulsen, Niels Kjølstad (Intern)
Main Supervisor:
Madsen, Henrik (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Erhvervsforskerordningen
Project: PhD