



CACHET Spring Seminar 2019

Agenda

13:00 Welcome

- Steffen Loft, Head of department, KU SUND
- Jakob Bardram, Director CACHET

13:10 Keynote: "User engagement in hearing aids R&D"

- Filip Rønne, Director Audiology, Widex

13:40 Workshops "Sharing best practice"

14:45 Break

14:35 Talk: "Telemedicine – learnings so far"

- Allan Green, Chief Consultant, Center for telemedicine, Capital Region

16:05 Break

16:25 Project madness

16:30 Keynote "Role of technology in medicine past, present, and future"

- Adam Bencard, Associate Professor, Medical Museion, KU

18:00 Closing





Strategic Goals

#1 – RESEARCH

- initiate and host new research projects and initiatives across partners

#2 – GROWTH & INNOVATION

- fuel and support health innovation, entrepreneurship and commercial growth in GCPH

#3 – VISIBILITY

- increase visibility and impact of research in health technology in GCPH



Healthcare Challenges



Chronic diseases management

Accounting for 2/3 of all healthcare spend worldwide – and increasing – chronic disease management is and will be the main focus of health.



Preventive and predictive health

Obesity, lack of physical activity and unhealthy lifestyle are the major factors for health problems and needs to be addressed early



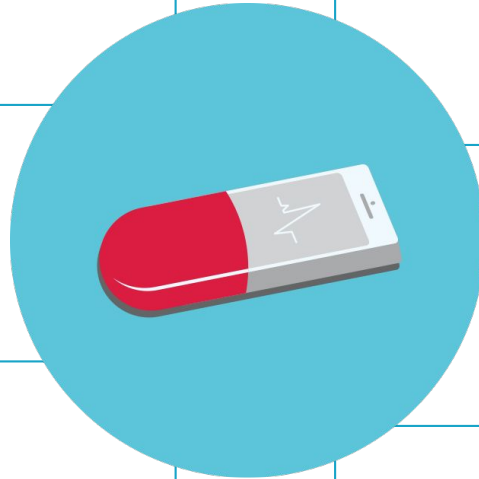
Regulatory

Legal and regulatory demands for protecting patient privacy, data, and safety will be enforced heavily as digital and personalized health emerge



Evidence & outcome-based health

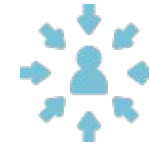
New business models both for suppliers and vendors will be tied to clinical evidence and real-world patient outcome (efficiency)



Technology Opportunities

Personalized technology

Engaging, patient-centric, and participatory technology can deliver interventions tailored to the individual and sustain engagement “beyond-the-pill” outside traditional care settings.



Digitalization

The ubiquity of digital health and communication technology drive new models for virtual and semi-automated doctor-patient contact.



Health IoT

Pervasive, mobile and wearable technology for sensing and engaging with patients create a unique platform for personalized health delivery



Big data analytics

Computing power and advanced analytics and learning algorithms drive insight and prediction of patient behavior, treatment, and care costs



2017

2018

Report

Health check of the Danish health technology sector development

Exhibition

Medico bazar '17

Open house

City of Copenhagen - Living lab

Seminar

Promoting physical activity in GDM pregnancy

Seminar

Disruption in the healthcare system

Seminar

Sund teknologi

CACHET RESEARCH SEMINAR 3

PhD presentations

Workshop

EU funding

Conference

DTU High Tech Summit 2017 - digital health track

Conference

3C health innovation

Report

CACHET in

Exhibi

Medic

CANCER

REAFEL

BHRP

CACHET RESEARCH PROJECTS

FUNDING PHD ROUND 4

Phy-Psy Trial

PACE

FUNDING PHD ROUND 5

InstaPatch









Research projects

CHS Copenhagen Healthtech Solutions
2016-2019 **Funding:** EU Regional Fund

GazeIT Accessibility by Gaze Tracking
2016-2019 **Funding:** Bevica Foundation

REACH Responsive Engagement of the Elderly
2016-2020 **Funding:** EU Horizon 2020

TEAM Technology Enabled Mental Health for Young People
2016-2020 **Funding:** EU Horizon 2020

RADMIS Reducing the Rate and Duration of Readmission
Among Patients With Unipolar and Bipolar Disorder
2016-2020 **Funding:** Innovation Fund Denmark

CANCER Detection of Mortality After Cancer Surgery
2017-2020 **Funding:** The Danish Cancer Society and
The A.P. Møller Foundation

BHRP Biometric Healthcare Research Platform
2017-2021 **Funding:** Innovation Fund Denmark

PACE Proactive Care for the Elderly with Dementia
2017-2021 **Funding:** Innovation Fund Denmark

REAFEL Reaching the Frail Elderly
2017-2021 **Funding:** Innovation Fund Denmark

Phy-Psy Trial A cluster randomised, parallel-group, 5-year
trial of coordinated, co-produced care to reduce the excess
mortality of patients with severe mental illness by improving
the treatment of their comorbid physical conditions
2017-2024 **Funding:** Novo Nordisk Foundation

FitMum Fitness for Good Health of Mother and Child
2018-2021 **Funding:** Independent Research Fund Denmark

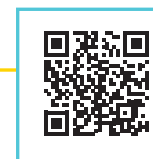
Q-EEG Quantitative EEG in alzheimer's Diagnostics
2018-2022 **Funding:** Der Wissenschaftsfonds

ARC-HUB Research Hub for Digital Enhanced Living
2018-2022 **Funding:** The Applied Research and Communica-
tions Fund

InstaPatch Instantaneous Allergy Testing in the Skin
2018-2022 **Funding:** Independent Research Fund Denmark

WARD Wireless Assessment of Respiratory and Circulatory
Distress 2018-2021 **Funding:** The Danish Cancer Society and
The A.P. Møller Fonden

For more information about CACHET research projects
and opportunities or collaboration, please visit
www.cachet.dk



cachet

Copenhagen
Center for
Health Technology 

Integrated Personalized Diabetes Management Goes Europe

iPDM-GO



PhD projects

Finalised PhD

Vital signs monitoring and interpretation for critically ill patients,

Adnan Vilic, Department of Electrical Engineering, Technical University of Denmark. **Supervisor:** Helge B.D. Sørensen.

Engineering systems design in healthcare: Smart mobile and wearable technology for support and monitoring in dementia rehabilitation,

Julia Rosemary Thorpe, Department of Management Engineering, Technical University of Denmark. **Supervisor:** Anja Maier.

Monitoring and modelling of behavioural changes using smartphone and wearable sensing,

Simon Due Kamronn, Department of Applied Mathematics and Computer Science, Technical University of Denmark.

Supervisor: Jakob Eg Larsen.

Personalising hearing care and enhancing user experience by adapting devices to the changing mobile context,

Benjamin Johansen, Department of Applied Mathematics and Computer Science, Technical University of Denmark.

Supervisor: Jakob Eg Larsen.

Behavioural design – from analysis to intervention to real world impact,

Camilla C.K. Nielsen, Department of Management Engineering, Technical University of Denmark. **Supervisor:** Philip Cash.

Adaptive smartphone-based behavioural activation for treating depression,

Darius Adam Rohani, Department of Applied Mathematics and Computer Science, Technical University of Denmark. **Supervisor:** Jakob E. Bardram.

Open-access data platform for behavioural monitoring and visual analytics for mental health,

Giovanna Nunes Vilaza, Department of Applied Mathematics and Computer Science, Technical University of Denmark.

Supervisor: Jakob E. Bardram.

Person-centric and device-agnostic activity-based integration in personal health technology,

Devender Kumar, Department of Applied Mathematics and Computer Science, Technical University of Denmark.

Supervisor: Jakob E. Bardram.

Ongoing PhD

Portable diagnostic laboratory to diagnose thyroid gland related disorders,

Georgi Plamenov Tanev, Department of Applied Mathematics and Computer Science, Technical University of Denmark. **Supervisor:** Jan Madsen.

Patient training for gaze-controlled telepresence,

Guangtao Zhang, Department of Management Engineering, Technical University of Denmark.

Supervisor: John Paulin Hansen.

Machine learning for smartphone-based monitoring and treatment of unipolar and bipolar disorders,

Jonas Busk, Department of Applied Mathematics and Computer Science, Technical University of Denmark.

Supervisor: Ole Winther.

Healthcare design for patient engagement and collaborative care,

Julie Falck Valentin-Hjorth, Department of Management Engineering, Technical University of Denmark. **Supervisor:** Anja Maier.

Design of monitoring systems for chronic sleep/brain disorders,

Mads Olsen, Department of Electrical Engineering, Technical University of Denmark.

Supervisor: Helge B.D. Sørensen.

Development and implementation of high-dimensional normal behavior areas for citizens with dementia, in proactive care at nursing homes,

Maxim Khomiakov, Department of Applied Mathematics and Computer Science, Technical University of Denmark. **Supervisor:** Anders Stockmarr.

Adaptive, context-aware cognitive therapy for young mental health,

Pegah Hafiz, Department of Applied Mathematics and Computer Science, Technical University of Denmark. **Supervisor:** Jakob E. Bardram.

Visualization design for heterogeneous data in personal health records,

Raju Maharjan, Department of Applied Mathematics and Computer Science, Technical University of Denmark. **Supervisor:** Jakob E. Bardram.

InstaPatch: Instantaneous allergy testing in the skin,

Sheida Esmail Tehrani, Department of Micro- and Nanotechnology, Technical University of Denmark. **Supervisor:** Stephan Sylvest Keller.

Communication keyboards for people with special needs,

Tanya Bafna, Department of Management Engineering, Technical University of Denmark.

Supervisor: John Paulin Hansen.



Gender balance



45%



55%

cachet

Copenhagen
Center for
Health Technology 

33



PhD

students

affiliated with CACHET

3



Finalised

PhD students

19

at DTU

14

at UCPH

18


Funded



by CACHET

cachet

Copenhagen
Center for
Health Technology 



Copenhagen
Center for
Health Technology

HOME
NEWS
RESEARCH
INNOVATION
EVENTS
ABOUT

CACHET > Research > Research Projects > [Motivating Physical Activity](#)

Research Projects

- > The Artificial Pancreas
- > FitMum
- > EEG-based Alzheimer Diagnosis
- > RADMIS
- > GazeIT
- > Detection of mortality after cancer surgery
- > MONARCA II
- > **Motivating Physical Activity**
- > SCAUT
- > Sound & Health
- > REACH
- > REAFEL
- > Biometric Healthcare Research Platform
- > The Phy-Psy Trial
- > TEAM
- > PACE
- > Research Hub for Digital Enhanced Living


PhD Projects

Past PhD Projects

Methodology

Studies

Publications



Motivating, monitoring, and maintaining physical activity by smartphones in overweight women and men

Sustaining healthy lifestyle in everyday routines has proven particular challenging. This project uses smartphones as personalized lifestyle devices to monitor, motivate, and maintain physical activity in overweight individuals.

Background

In most lifestyle-based interventions, a beneficial health effect is observed while the intervention is ongoing. However, in the transition from exercise intervention to everyday routine, outcomes regarding the maintenance of physical activity are often disappointing. This project utilizes smartphones as personalized lifestyle devices to monitor, motivate, and maintain physical activity in overweight individuals. Researchers with medical, technological, and social sciences expertise collaborate closely in an interdisciplinary research environment to study existing and develop new smartphone applications to provide valid assessments of physical activity, behavior, and biofeedback concerning physical activity. The aim is to improve the understanding of the transition from exercise intervention to everyday routine in order to promote maintenance of an active lifestyle in overweight individuals.

Project Objectives

Seventy percent of the Danish adult population owns a smartphone, which via its built-in GPS, wireless technology, and accelerometer can be used to monitor physical activity level. In this project, we will examine the ability of smartphones to precisely monitor energy expenditure in different domains of everyday life. Such measurements would enable us to determine the domain-specific compensation for an increase in physical activity in one domain (i.e., leisure or transportation); in other words, if an increase in exercise energy expenditure in one domain is absorbed in another domain. In this project, the smartphone-technology results obtained will be directly compared to measurements of energy expenditure by indirect calorimetry and doubly-labeled water in selected

f t in


FUNDING

Med støtte fra
TrykFonden

LINKS


- > GO-ACTIVE Project
- > Governing Obesity
- > Project Description

Contact




Bente Merete Stallknecht
Professor
Department of Biomedical Sciences
bstall@sund.ku.dk

Contact



Jakob Eg Larsen
Associate Professor
DTU Compute
+45 45 25 52 65
jaeg@dtu.dk

Contact



Simon Due Kamronn
PhD student
DTU Compute
+45 40 92 97 92
sdka@dtu.dk



Copenhagen
Center for
Health Technology

HOME
NEWS
RESEARCH
INNOVATION
EVENTS
ABOUT

CACHET > Research > PhD Projects > [Smart Wearables for Dementia Monitoring](#)

Research Projects

PhD Projects

- > Personal Health Data Visualization
- > Monitoring systems
- > RADMIS
- > Body Age
- > Collaborative Care
- > eMinor
- > FitMum - Activity During Pregnancy
- > FitMum - Validity of tracker
- > InstaPatch
- > Physical Activity Monitors
- > Assessment of Cognitive Functioning
- > Smartphone-based biomarkers
- > WARD-SURGERY
- > WARD-COPD
- > Behavioural Activation
- > Personalizing Hearing Care
- > **Smart Wearables for Dementia Monitoring**
- > Neurorehabilitation Tool for Post-Stroke Patients
- > Behavioural Design

Past PhD Projects

Methodology

Studies

Publications



Engineering Systems Design in Healthcare: Smart Wearables for Dementia Monitoring

Smart wearables are capable of both supporting people with dementia and generating data about their behaviour. This project explores how this could be leveraged in a connected care system to enable active ageing.

Background

Smart technology and wearable sensors are growing in popularity and being woven into our everyday lives. Concurrently, the population is ageing, giving rise to challenges such as an increasing prevalence of dementia. This motivates us to harness the capabilities of smart wearables in addressing such challenges. Already, our smartphones and smartwatches are able to provide intelligent reminders, guide us home, enable us to engage with friends and family, and monitor aspects of our wellbeing. This functionality is well-suited to improving independence and quality of life among the elderly and cognitively impaired; however it is the young and healthy who are adopting these products. We are therefore interested in exploring how wearables might be adapted to match the needs and capabilities of the dementia care network, and integrated into care practices. In doing so, we hope to guide designers and other stakeholders towards realising this vision of a connected care system.

f t in

PARTNERS

- > DTU Management Engineering
- > Dementia and Memory Clinic, Rigshospitalet, Glostrup
- > VihTek – Videncenter for hjælpemidler og velfærdsteknologi

Contact



Julia Rosemary Thorpe
PhD student
DTU Management Engineering
jrth@dtu.dk

Contact



Anja Maler
Professor, Head of Division
DTU Management Engineering
+45 45 25 60 45
amal@dtu.dk

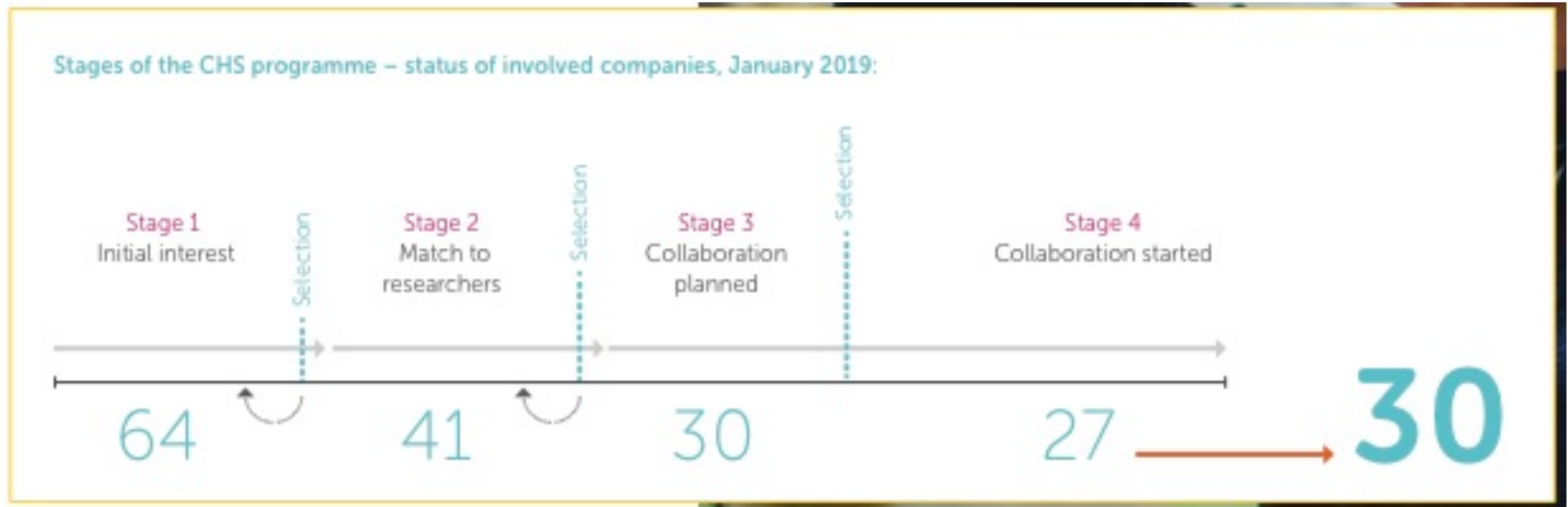
Contact



Hysse Birgitte Forchhammer
Leading Neuropsychologist
Neurology Department, Rigshospitalet, Glostrup

SUPPORTING INDUSTRY

Copenhagen Healthtech Solutions (CHS)



CACHET in Profile 2019

- Research
- Training
- Innovation in Society
- Supporting Industry
- About CACHET

Welcome

The Copenhagen Centre for Health Technology (CACHET) is a world-leading research center with a vision to promote and support healthy living, active ageing and chronic disease prevention and management through Personalised Health Technology. CACHET is inaugurated as a strategic partnership between the Capital Region of Denmark, the City of Copenhagen, the Faculty of Health and Medical Sciences at the University of Copenhagen and the Technical University of Denmark.

Excellent research
CACHET fosters and initiates a wide range of interdisciplinary research projects at the intersection of the technical and medical sciences, taking their outset in specific healthcare challenges in the Danish society. By coupling a user-centered research and innovation process with solid academic knowledge, the research focuses on application and impact.

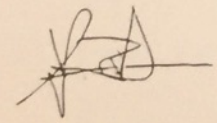
Research training
The CACHET PhD programme funds and trains the health technology researchers of the future. Our competitive PhD programme is designed to foster problem-oriented, interdisciplinary and entrepreneurial research. Be it in academia, industry, society in general or in the clinic, these researchers will be the frontrunners in developing the technology-based healthcare model of the future.

Industrial innovation
Most of CACHET's research is done with our 23 industrial partners. There is a strong focus on translating research into new technologies and products for commercial growth in the Danish industry. The CACHET innovation programme helps companies to work with top-class researchers in a flexible and pragmatic way.

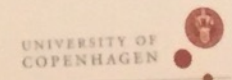
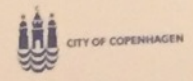
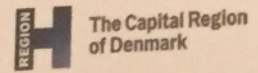
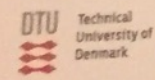
Societal and healthcare innovation
By addressing major health challenges in the Danish society, CACHET research starts and ends with societal innovation. CACHET works to translate research into new technologies and healthcare services for the benefit of patients and the Danish healthcare system.

This small book is made in order to provide an overview and status of the research, training and innovation of CACHET as it were at the end of 2017.

Enjoy the reading



Jakob E. Bardram, MSc, PhD
Director, Professor



"CACHET will support active ageing and medical design, development of personal



Agenda

13:00 Welcome

- Steffen Loft, Head of department, KU SUND
- Jakob Bardram, Director CACHET

13:10 Keynote: "User engagement in hearing aids R&D"

- Filip Rønne, Director Audiology, Widex

13:40 Workshops "Sharing best practice"

14:45 Break

14:35 Talk: "Telemedicine – learnings so far"

- Allan Green, Chief Consultant, Center for telemedicine, Capital Region

16:05 Break

16:25 Project madness

16:30 Keynote "Role of technology in medicine past, present, and future"

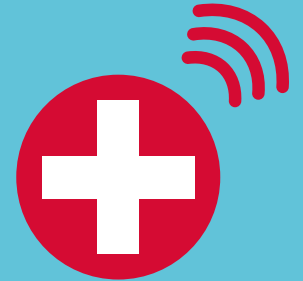
- Adam Bencard, Associate Professor, Medical Museion, KU

18:00 Closing



cachet

Copenhagen
Center for
Health Technology



Technical
University of
Denmark



The Capital Region
of Denmark



CITY OF COPENHAGEN

UNIVERSITY OF
COPENHAGEN



Important CACHET events ahead

CALENDAR [All](#)

27 **Spring Seminar**
MAY 11:00 Spring Seminar

04 **Data Driven User Experience...**
JUN 13:00 PhD Defence - Benjamin Johansen

12 **TTRN PhD Course: Research...**
AUG 9:00 TTRN PhD Course

16 **13th ACM Conference on...**
SEP 9:00 RecSys 2019

cachet | Copenhagen Center for Health Technology

HOME NEWS **RESEARCH** INNOVATION EVENTS ABOUT

CACHET › Research › PhD Projects › [Personalizing Hearing Care](#)

f t in

Research Projects


Finalized Research Projects

PhD Projects

- › Lab-on-a-chip
- › Personal Health Data Visualization
- › Monitoring systems
- › Gaze-Controlled Telepresence
- › RADMIS
- › Body Age
- › Collaborative Care
- › eMinor
- › FitMum: Activity During Pregnancy
- › FitMum: Process evaluation
- › FitMum: Validity of tracker
- › InstaPatch
- › Physical Activity Monitors
- › Assessment of Cognitive Functioning
- › Smartphone-based biomarkers
- › WARD-SURGERY
- › WARD-COPD
- › Behavioural Activation
- › **Personalizing Hearing Care**
- › Behavioural Design
- › Eye-tracking based Fatigue and Cognitive Assessment
- › Listen Care-fully
- › Monitoring and Treatment of Unipolar and Bipolar Disorders
- › Data platform for analytics for mental health

Finalized PhD Projects

Methodology



Personalizing Hearing Care and Enhancing User Experience by Adapting Devices to the Changing Mobile Context

Hearing impairment is a growing health- and wellbeing challenge both at a personal and a societal level. This project explores the use of hearing aids, smartphones and mobile devices to personalise hearing aids to the individual.

Background

Hearing impairments have an impact on both the society and the individual. For the individual hearing loss may lead to a withdrawal from social life, cognitive decline [Rönnerberg et. al. 2011] and risk of dementia [Lin et. al. 2011]. A recent report estimated that the overall economic burden associated with hearing loss to be £30 billion per year alone in the UK [Archbold 2014]. Today hearing impairment is associated with an aging population, in the future this will change. A rising number of adolescents [Shargorodsky 2010] as well as a large segment of people already in their 40s [Curhan 2010] are struggling to interact in distracting open office environments and in everyday environments characterized by ubiquitous background noise.


Project Objectives

Despite two decades of fierce innovation with digital hearing devices, most fitting of hearing devices is still limited to measurement of audiogram, followed by a standard fitting with limited possibility for fine tuning at follow up meetings between hearing impaired users and audiologists. Thus, while hearing devices enables increasingly personalization, time constraints prevents clinical practice


PARTNERS

- › Oticon
- › Eriksholm Research Centre
- › Rigshospitalet Department of Otorhinolaryngology
- › DTU Compute


Contact

 **Benjamin Johansen**
stud
✉

Contact

 **Jakob Eg Larsen**
Associate Professor
DTU Compute
+45 45 25 52 65
jaeg@dtu.dk

Contact

 **Niels Henrik Pontoppidan**
Research Area
Manager, Advanced Algorithms
Eriksholm Research Center



ACM Transactions on Computing for Healthcare (HEALTH)

a multidisciplinary journal for high-quality original work on how computing is improving healthcare



[Home](#) [Authors](#) [Editors](#) [Reviewers](#) [Policies](#) [About](#) [Contact](#) [Subscribe](#)

NEWS

ACM Transactions on Computing for Healthcare (HEALTH) is a multi-disciplinary journal for the publication of high-quality original research papers, survey papers, and challenge papers that have scientific and technological results pertaining to how computing is improving healthcare. This journal is multidisciplinary, intersecting CS, ECE, mechanical engineering, bio-medical engineering, behavioral and social science, psychology, and the health field, in general. All submissions must show evidence of their contributions to the computing field as informed by healthcare. We do not publish papers on large pilot studies, diseases, or other medical assessments/results that do not have novel computing research results. Datasets and other artifacts needed to support reproducibility of results are highly encouraged. Proposals for special issues are encouraged.

[READ MORE](#)

[All ACM Journals](#) | [See Full Journal Index](#)

SOCIAL MEDIA





CACHET Deployment Trophy



August 2017 : **Team “MORIBUS”**

- Darius Rohani
- Andrea Q. Lopategui



January 2018 : **Team “AWEAR”**

- Julia R. Thorpe

August 2018 : Team "ICAT"

- Pegah Hafiz
- Lorant Gulyas
- Kasia Żukowska



November 2018 : Team "FitMum"


- Caroline Borup Andersen
- Saud Abdulaziz M Alomairah
- Signe de Place Knudsen

Nominated...

- CARP Mobile Sensing [CARP]
 - deployed as a public package @ Dart Pub
- Home-based Screening of Autism [BHRP]
 - deployed in homes in Gothenburg, Sweden
- E-CAKe
 - Eye-tracking based Cognitive Assessment via Keyboard
- MUBS
 - mHealth support for Behavioral Activation
- REACH 2020
 - studying motivation to use health technology

Team “E-CAKe”

- Tanya Bafna



Copenhagen Center for Health Technology

HOME NEWS **RESEARCH** INNOVATION EVENTS ABOUT

CACHET > Research > Studies > E-CAKe

Research Projects

Finalized Research Projects

PhD Projects


Finalized PhD Projects

Methodology


Studies

- ▼ E-CAKe
- > FitMum
- > Motivation til et mere aktivt ældreliv
- > ICAT
- > MORIBUS
- > MUBS
- > AWEAR

Publications



Contact



Tanya Bafna
PhD student
DTU Management
+45 45 25 45 56
taba@dtu.dk

E-CAKe

Eye-tracking based Cognitive Assessment via Keyboard (E-CAKe)

E-CAKe is an experiment to establish typing as a method that induces cognitive load, as validated using verified, self-reported cognitive load assessment tools. The typing is performed using eye-tracking, so as to simulate the situation of typing and communication in people who use eye-tracking in augmentative and alternative communication systems.

