Influence of exercise history on fall-induced hip fracture risk.

Hip fracture is a major public health problem. Thin superolateral cortex of the femoral neck experiences unusually high stress in a sideway fall, contributing to hip fracture risk. The aim of this study is to examine how exercise based loading history, known to affect the femoral neck cortical structure, influences fall-induced fracture risk. For this purpose, finite element models were created from the proximal femur MRI of 91 young athletic and 20 control females. Fall-induced superolateral cortical safety factors (SF) were estimated in the distal volume of femoral neck. Significantly higher ($p < 0.05$) SFs were observed from femoral necks with high impact (H-I), odd impact (O-I), and repetitive impact (R-I) exercise history, indicating lower fracture risk. The results indicate that it is advisable to include some impact exercise in a fracture preventive exercise program.

General information

Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Civil Engineering, Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group, UKK Institute for Health Promotion Research, Jyväskylän yliopisto, Jyvaskyla Central Hospital, GeroCenter Foundation
Contributors: Abe, S., Narra , N., Nikander, R., Hyttinen, J., Kouhia, R., Sievänen, H.
Number of pages: 4
Pages: 464-467
Publication date: 2017

Host publication information

Title of host publication: Proceeding of the 35th International Conference on Biomechanics in Sports : German Sport University Colgne, Cologne, Germany, June 14-18, 2017
Volume: 1
Editors: Potthast, W., Niehoff, A., David, S.
Keywords: Hip fracture, Exercise, Finite element method (FEM), Bone fracture, Bone strength, falling
URLs:

https://dshs-koeln.sciebo.de/index.php/s/CamALh9yXz0k6Vt#pdfviewer

Bibliographical note

EXT="Sievänen, Harri"
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Association of exercise loading history with fall-induced hip fracture risk.

General information

Publication status: Published
Organisations: Civil Engineering, Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group, UKK Institute for Health Promotion Research, Jyväskylän yliopisto, Jyvaskyla Central Hospital, GeroCenter Foundation
Contributors: Abe, S., Narra , N., Nikander, R., Hyttinen, J., Kouhia, R., Sievänen, H.
Publication date: 2017
Peer-reviewed: Unknown
Event: Paper presented at Congress of the european society of biomechanics, .
Keywords: Hip fracture, Exercise, Finite element method (FEM), Bone strength, Falling
URLs:

http://esbiomech.org/conference/index.php/esb2017/seville/paper/view/1149/885

Bibliographical note

EXT="Sievänen, Harri"
Research output: Other conference contribution › Paper, poster or abstract › Scientific

Impact loading history modulates hip fracture load and location: A finite element simulation study of the proximal femur in female athletes

Sideways falls impose high stress on the thin superolateral cortical bone of the femoral neck, the region regarded as a fracture-prone region of the hip. Exercise training is a natural mode of mechanical loading to make bone more robust. Exercise-induced adaptation of cortical bone along the femoral neck has been previously demonstrated. However, it is unknown whether this adaption modulates hip fracture behavior. The purpose of this study was to investigate the influence of specific exercise loading history on fall-induced hip fracture behavior by estimating fracture load and location with proximal femur finite element (FE) models created from magnetic resonance images (MRI) of 111 women with distinct exercise histories: 91 athletes (aged 24.7±6.1years, >8years competitive career) and 20 women as controls (aged 23.7±3.8years). The athletes were divided into five groups based on typical loading patterns of their sports: high-impact (H-I: 9 triple-jumpers and 10 high jumpers), odd-impact (O-I: 9 soccer and 10 squash players), high-magnitude (H-M: 17 power-lifters), repetitive-impact (R-I: 18 endurance runners), and repetitive non-impact (R-NI: 18 swimmers). Compared to

the controls, the H-I, O-I, and R-I groups had significantly higher (11–26%, $p<0.05$) fracture loads. Also, the fracture location in the H-I and O-I groups was significantly more proximal (7–10%) compared to the controls. These results suggest that an exercise loading history of high impacts, impacts from unusual directions, or repetitive impacts increases the fracture load and may lower the risk of fall-induced hip fracture.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Civil Engineering, Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group, UKK Institute for Health Promotion Research, Jyväskylän yliopisto, Jyvaskyla Central Hospital, GeroCenter Foundation, GeroCenter Foundation for Aging Research and Development
Contributors: Abe, S., Narra Girish, N., Nikander, R., Hyttinen, J., Kouhia, R., Sievänen, H.
Number of pages: 8
Pages: 136-143
Publication date: 25 Jul 2018
Peer-reviewed: Yes

Publication information
Journal: Journal of Biomechanics
Volume: 76
ISSN (Print): 0021-9290
Ratings:

Scopus rating (2018): CiteScore 4.7 SJR 1.149 SNIP 1.429
Original language: English
ASJC Scopus subject areas: Public Health, Environmental and Occupational Health, Biomedical Engineering
Keywords: Bone strength, finite element modeling, Exercise, falling, femoral neck
DOIs:

10.1016/j.jbiomech.2018.05.037

Bibliographical note
EXT="Sievänen, Harri"
Research output: Contribution to journal › Article › Scientific › peer-review

Comparison of injury severity between moped and motorcycle crashes: A finnish two-year prospective hospital-based study
Background and Aims: The coverage of the official statistics is poor in motorcycle and moped accidents. The aim of this study was to analyze the severity of motorcycle and moped crashes, and to define the degree of under-reporting in official statistics. Material and Methods: All first attendances due to an acute motorcyclist or moped driver injury registered in the emergency department between June 2004 and May 2006 were analyzed. The severity of the injuries was classified using the Abbreviated Injury Scale score and the New Injury Severity Score. The hospital injury data were compared to the traffic accident statistics reported by the police and compiled and maintained by Statistics Finland. Results: A total of 49 motorcyclists and 61 moped drivers were involved in crashes, leading to a total of 94 and 109 injuries, respectively. There were slightly more vertebral and midfoot fractures among motorcyclists than among moped drivers ($p = 0.038$ and 0.016, respectively). No significant differences were found between the severity (maximum Abbreviated Injury Scale and median New Injury Severity Scores) of the motorcycle and moped crashes. There was no in-hospital mortality. The degree of agreement (overlap) between the hospital dataset and the official statistics was 32%. The rate of under-reporting was 68%. Conclusions: According to the maximum Abbreviated Injury Scale and New Injury Severity Scores, the injury severity was equal for motorcycle and moped crashes. The degree of agreement between the hospital dataset and the official statistics was 32%.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Department of Information Management and Logistics, University of Helsinki, North Kymi Hospital
Contributors: Airaksinen, N., Nurmi-Lüthje, I., Lüthje, P.
Number of pages: 7
Pages: 49-55
Publication date: 1 Mar 2016
Peer-reviewed: Yes

Publication information
Journal: Scandinavian Journal of Surgery
Volume: 105
Issue number: 1
ISSN (Print): 1457-4969

Ratings:

Scopus rating (2016): CiteScore 3.5 SJR 0.675 SNIP 1.28
Original language: English
ASJC Scopus subject areas: Surgery
Keywords: Injury, Injury severity, Moped, Mortality, Motorcycle, Under-reporting
DOIs:

10.1177/1457496915571401
URLs:

http://hdl.handle.net/10138/161322

Bibliographical note
INT=tlo,"Airaksinen, N."
Source: Scopus
Source ID: 84960346612
Research output: Contribution to journal › Article › Scientific › peer-review

Pathways leading to suicide in schizophrenia
The aim of this systematic review is to report the pre- and postmorbid trajectories leading to suicide in schizophrenia, with special focus on novel research published in 2003-2006. Individuals with schizophrenia who commit suicide seem to follow a developmental trajectory that differs partly from that of other schizophrenia patients. According to the studies analysed, there seem to be five main pathways for schizophrenia patients leading to suicide. One obvious pathway is comorbid depression that leads to suicide. Second, there is a group of patients with a difficult, chronic course of illness and many relapses and exacerbations. They lose their hope progressively over time. The third group comprises patients (mostly young males) with impulsiveness, dysphoric affect and substance abuse. Fourth, there is a relatively small but theoretically interesting and clinically important group of mainly young patients with high premorbid functioning and above average intellectual capacity. The high suicide rate among this group may be a consequence of their own and their relatives' high expectations that are in line with their good premorbid functioning. The fifth group, failure in treatment, comprises patients lacking social support whose treatment has failed. We also propose a life span model showing these five different pathways to suicide in schizophrenia. These suicidal trajectories could be useful in clinical work when evaluating patients' possible suicide risk and treating them. They might also provoke some further research ideas and hypotheses.

General information
Publication status: Published
MoE publication type: A2 Review article in a scientific journal
Organisations: University of Oulu
Contributors: Alaräisänen, A., Heikkinen, J., Kianickova, Z., Miettunen, J., Räsänen, P., Isohanni, M.
Number of pages: 10
Pages: 233-242
Publication date: 1 Nov 2007
Peer-reviewed: Yes

Publication information
Journal: Current Psychiatry Reviews
Volume: 3
Issue number: 4
ISSN (Print): 1573-4005
Ratings:

Scopus rating (2007): SJR 0.343 SNIP 0.339
Original language: English
ASJC Scopus subject areas: Psychiatry and Mental health
Keywords: Developmental trajectory, Life-span, Schizophrenia, Suicide
DOIs:

10.2174/157340007782408879

Bibliographical note
EXT="Löhönen, Johanna"
Source: Scopus
Source ID: 36248988609
Research output: Contribution to journal › Review Article › Scientific › peer-review

Implementation and User Testing of a System for Visualizing Continuous Health Data and Events
Efficient ways are needed to visualize the health status of a person and how the lifestyle, daily choices and health care actions are affecting it. Current systems lack a comprehensive interface for interaction and exploration of large and complex data and events affecting the data. Based on state-of-the-art data visualization techniques, we implemented and

user tested a system that visualizes health data holistically over time. The system focuses on the dynamic changes by using a timeline of events affecting the overall health status. We conducted an extensive user testing process involving surveys, heuristics and observations in order to evaluate our system. The results show that our system has a high level of User Satisfaction while providing an adequate understanding, interaction and navigation of the data.

General information

Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Department of Signal Processing, Research group: Personal Health Informatics-PHI, Tampere University of Technology
Contributors: Al-Musawi, M., Ledesma, A., Nieminen, H., Korhonen, I.
Number of pages: 4
Pages: 156-159
Publication date: Feb 2016

Host publication information

Title of host publication: 2016 IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI)
Publisher: IEEE
ISBN (Print): 978-1-5090-2455-1
Keywords: health, Visualization, Health and wellness applications, Javascript, Health data, application
DOIs:

10.1109/BHI.2016.7455858

Bibliographical note

INT=sgn,"Al-Musawi, Mohammed"
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

EU*US eHealth Works to Improve Global Workforce Development

For the past several decades, healthcare organizations and providers in the United States, the European Union and other countries around the globe, have advanced the digital transformation of healthcare to help increase quality, safety and efciency. Health information technology/eHealth enables healthcare workers and providers the opportunity to maximize their care delivery, ultimately resulting in better outcomes for patients, consumers and society.

The core of any healthcare system is its workforce. Therefore, healthcare systems require a robust supply of highly skilled professionals who are profcient in eHealth/health IT to use, operate and maintain the digital services, which are an increasingly essential part of their infrastructure. Some of these professionals are frontfacing care providers such as doctors, nurses, pharmacists and other caregivers and need "eSkills" to achieve and sustain success in their work. Others are on the extended healthcare team, such as clinical informaticists, health information sta?, biomedical engineers and researchers, employ eHealth on a daily basis where the use of ICT (information and communications technology) is critical. Furthermore, some healthcare sta? that may not be traditionally thought of as using ICT in their work, such as pastoral care workers (clergy), environmental workers, or nutritional sta?, who are also more frequently relying on digital services and technology to manage their daily tasks.

To take on these expanded duties, all workers within the healthcare environment must be trained in eHealth, preferably before they even receive their frst job. Therefore, the development and advancement of a healthcare workforce equipped with eHealth skills is vital to the present and future state of healthcare. This eHealth enabled workforce will assure that systems keep working functionally, that clinical workflows are incorporated into technology, and that healthcare is delivered in a manner that is safe, secure and qualityinfused.

This paper will discuss the ways in which the EU*US eHealth Project, in cooperation with its Consortium members and a large stakeholder community, will work to measure, inform, educate and advance development of a skilled eHealth workforce throughout the European Union, United States and globally, with the goal of creating a legacy of digitally empowered health care professionals now and in the future.

General information

Publication status: Published
MoE publication type: D2 Article in professional manuals or guides or professional information systems or text book material
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Sleep and Sensory Signal Analysis Group-SSSAG, Research group: Personal Health Informatics-PHI, Omni Micro Systems und Omni Med Solutions UG, Healthcare Information and Management Systems Society, University of Applied Sciences Osnabrück, European Health Telematics Association
Contributors: Blake, R., Shaw, T., Blake, A., Hübner, U., Kaye, R., Schug, S., Thye, J., Värri, A.
Number of pages: 12
Pages: 1-12
Publication date: 7 Mar 2017

Host publication information
Title of host publication: HIMSS White Papers
Publisher: Healthcare Information and Management Systems Society
ASJC Scopus subject areas: Computer Science (miscellaneous), Health Professions(all)
Keywords: health informatics competency, health informatics skills, health informatics workforce, health informatics education, health information technology
Electronic versions:

Eu-us-ehealth-workforce-development
URLs:

http://www.himss.org/library/euus-ehealth-works-improve-global-workforce-development

http://urn.fi/URN:NBN:fi:tty-201711232249
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Professional

The impact of acquisition dose on quantitative breast density estimation with digital mammography: results from ACRIN PA 4006

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: University of Pennsylvania
Contributors: Chen, L., Ray, S., Keller, B., Pertuz, S., McDonald, E., Conant, E., Kontos, D.
Publication date: Sep 2016
Peer-reviewed: Yes

Publication information
Journal: Radiology
Volume: 280
Issue number: 3
ISSN (Print): 0033-8419
Ratings:

Scopus rating (2016): CiteScore 12.5 SJR 3.56 SNIP 2.811
Original language: English
DOIs:

10.1148/radiol.2016151749
Research output: Contribution to journal › Article › Scientific › peer-review

Temperature-dependence of the single-cell variability in the kinetics of transcription activation in Escherichia coli
From in vivo single-cell, single-RNA measurements of the activation times and subsequent steady-state active transcription kinetics of a single-copy Lac-ara-1 promoter in Escherichia coli, we characterize the intake kinetics of the inducer (IPTG) from the media, following temperature shifts. For this, for temperature shifts of various degrees, we obtain the distributions of transcription activation times as well as the distributions of intervals between consecutive RNA productions following activation in individual cells. We then propose a novel methodology that makes use of deconvolution techniques to extract the mean and the variability of the distribution of intake times. We find that cells, following shifts to low temperatures have higher intake times, although, counter-intuitively, the cell-to-cell variability of these times is lower. We validate the results using a new methodology for direct estimation of mean intake times from measurements of activation times at various inducer concentrations. The results confirm that E. coli's inducer intake times from the environment are significantly higher, following a shift to a sub-optimal temperature. Finally, we provide evidence that this is likely due to the emergence of additional rate-limiting steps in the intake process at low temperatures, explaining the reduced cell-to-cell variability in intake times.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Laboratory of Biosystem Dynamics-LBD
Contributors: Goncalves, N., Startceva, S., Palma, C., Bahrudeen, M., Oliveira, S., Ribeiro, A. S.
Publication date: Jan 2018
Peer-reviewed: Yes

Publication information
Journal: Physical Biology
Volume: 15
Issue number: 2
ISSN (Print): 1478-3967
Ratings:

Scopus rating (2018): CiteScore 3.4 SJR 1.066 SNIP 0.632
Original language: English
Electronic versions:

Goncalves2018 Temperature dependence
DOIs:

10.1088/1478-3975/aa9ddf
URLs:

http://urn.fi/URN:NBN:fi:tuni-201911186020

Bibliographical note

Source: PubMed
Source ID: 29182518
Research output: Contribution to journal › Article › Scientific › peer-review

Abstract: High-resolution live cell imaging during mechanical vibration loading
Utilizing of a specially designed vibration stimulator for real-time live cell imaging in mechanotransduction research

General information
Publication status: Published
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group
Contributors: Halonen, H., Ihalainen, T., Hyttinen, J.
Number of pages: 1
Pages: 24-24
Publication date: 26 Oct 2017
Peer-reviewed: Unknown
Event: Paper presented at BMT and MED Research Day 2017, Tampere, Finland.
Keywords: mechanotransduction, Vibration, Mechanical stimulation, epithelial cell
Research output: Other conference contribution › Paper, poster or abstract › Scientific

Abstract: Vibration stimulator for imaging mechanotransduction based cell responses
Presenting a specially designed vibration stimulator system for live cell imaging

General information
Publication status: Published
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group
Contributors: Halonen, H., Ihalainen, T., Hyttinen, J.
Number of pages: 1
Pages: 49-49
Publication date: 7 Jul 2017
Peer-reviewed: Unknown
Event: Paper presented at EMBEC'17 & NBC'17 | Joint Conference 11-15 June 2017, Tampere, Tampere, .
Keywords: mechanotransduction, Vibration, Mechanical stimulation, Epithelial cell
URLs:

http://embec2017.org/wp-content/uploads/2017/07/EMBEC_NBC_2017_Abstract_Book_Final.pdf (Abstract book)
Research output: Other conference contribution › Paper, poster or abstract › Scientific

Abstract: Vibration stimulator for microscopying of fast cell responses
Presenting a tool for mechanotransduction research for studying fast epithelial cell responses to the vibration stimulation

General information
Publication status: Published
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group
Contributors: Halonen, H., Ihalainen, T., Hyttinen, J.
Number of pages: 1
Publication date: 2 Jul 2017
Peer-reviewed: Unknown
Event: Paper presented at The 23rd Congress of the European Society of Biomechanics, Seville, Spain.
Keywords: mechanotransduction, vibration, mechanical stimulation, epithelial cell
URLs:

https://esbiomech.org/conference/index.php/esb2017/seville/paper/viewFile/1544/712 (Abstract)
Research output: Other conference contribution › Paper, poster or abstract › Scientific

Lääketieteen kirjallisuustietokannat ja tiedonhaku

Lääketieteen tieto on nopeasti uusiutuvaa, ja siksi oikeiden tiedonlähteiden tunteminen ja paikantaminen ovat jatkuvasti muuttuva haaste alalla toimiville.
Elektroniset tietokannat ja portaalit ovat tärkeitä välineitä tiedon saavuttamiseksi, mutta lähteiden valinta niin, että haku on riittävän kattava, voi olla vaikeaa. Lääketieteellisen tiedon välittämisessä tieteelliset lehdet ovat keskeisessä asemassa ja niiden tietokantojen käyttö on tärkeä taito. Monet kustantajat tarjoavat julkaisemiaan lehtiä kokotekstinä elektronisessa muodossa, ja niissä tieto on helposti ja kattavasti saavutettavissa.

General information

Publication status: Published
MoE publication type: A2 Review article in a scientific journal
Organisations: University of Oulu, Univ Oulu, University of Oulu, Dept Clin Chem
Contributors: Heikkinen, J., Isohanni, M., Miettunen, J.
Pages: 2156-2170
Publication date: 2007
Peer-reviewed: Yes

Publication information

Journal: Suomen Lääkärilehti
Volume: 62
Issue number: 22
ISSN (Print): 0039-5560
Original language: Finnish
URLs:

https://www.laakarilehti.fi/pdf/2007/SLL222007-2165.pdf

Bibliographical note

EXT="Heikkinen, Johanna"
Research output: Contribution to journal › Review Article › Scientific › peer-review

The digital patient journey solution for patients undergoing elective hip and knee arthroplasty: Protocol for a pragmatic randomized controlled trial

Aim: To describe a randomized controlled trial (RCT) protocol that will evaluate the effectiveness of a digital patient journey (DPJ) solution in improving the outcomes of patients undergoing total hip and knee arthroplasty.
Background: There is an urgent need for novel technologies to ensure sustainability, improve patient experience, and empower patients in their own care by providing information, support, and control.
Design: A pragmatic RCT with two parallel arms.
Methods: The participants randomized assigned to the intervention arm (N = 33) will receive access to the DPJ solution. The participants in the control arm (N = 33) will receive conventional care, which is provided face to face by using paper-based methods. The group allocations will be blinded from the study nurse during the recruitment and baseline measures, as well as from the outcome assessors. Patients with total hip arthroplasty will be followed up for 8–12 weeks, whereas patients with total knee arthroplasty will be followed up for 6–8 weeks. The primary outcome is health-related quality of life, measured by the EuroQol EQ-5D-5L scale. Secondary outcomes include functional recovery, pain, patient experience, and self-efficacy. The first results are expected to be submitted for publication in 2020.
Impact: This study will provide information on the health effects and cost benefits of using the DPJ solution to support a patient's preparation for surgery and postdischarge surgical care. If the DPJ solution is found to be effective, its implementation into clinical practice could lead to further improvements in patient outcomes. If the DPJ solution is found to be cost effective for the hospital, it could be used to improve hospital resource efficiency.

General information

Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Communication Sciences, Research group: TUT Game Lab, University of Oulu, Oulu University Hospital, VTT Technical Research Centre of Finland, RMIT University
Contributors: Jansson, M., Vuorinen, A. L., Harjumaa, M., Similä, H., Koivisto, J., Puhto, A., Vesty, G., Pikkarainen, M.
Number of pages: 13
Pages: 1436-1448
Publication date: 2020
Peer-reviewed: Yes

Publication information

Journal: Journal of Advanced Nursing

Volume: 76
Issue number: 6
ISSN (Print): 0309-2402
Original language: English
ASJC Scopus subject areas: Nursing(all)
Keywords: arthroplasty, digital patient journey solution, mobile health, nursing, randomized controlled trial
DOIs:
10.1111/jan.14343

Bibliographical note

DUPL=52527538
Source: Scopus
Source ID: 85081737725
Research output: Contribution to journal › Article › Scientific › peer-review

Identified opportunities for gamification in the elective primary fast-track total hip and knee arthroplasty journey: Secondary analysis of healthcare professionals' interviews

Aims and objectives: To identify opportunities for gamification in the elective primary fast-track total hip and knee arthroplasty journey in order to support patients' health-related behaviour.
Background: Gamification provides an opportunity to increase engagement in a given health behaviour and, eventually, the possibility of reaching improved outcomes through continued or consistent behaviour.
Design: A secondary analysis.
Methods: Semi-structured interviews were conducted with 20 healthcare professionals in a single joint-replacement centre in Finland during autumn 2018. NVivo software was used for deductive and inductive coding. The open codes were also calculated. The consolidated criteria for reporting qualitative research were followed.
Results: Gamification opportunities were identified related to six dimensions: accomplishment, challenge, competition, guided, playfulness and social experience. Based on the frequencies of the coded content, most opportunities for gamification can be identified in the context of personalised counselling, monitoring and social support.
Conclusions: Several opportunities for gamification were identified and quantified. While various needs and limitations need to be considered when developing digital gamified solutions and more research into the effectiveness of such solutions will be required, the current study opens possible future avenues for exploring the use of gamification in lower limb joint replacement journey and other specialisms.
Relevance to clinical practice: This study provides an important insight into healthcare professionals' views of the current state of the total hip and knee arthroplasty journey and the potential for its development. In addition, it pinpoints the biggest opportunities for gamified services in the context of personalised counselling, monitoring and social support. Despite the focus of this secondary analysis being on the arthroplasty journey, the findings can also be generalised in other surgical journeys.

General information

Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Communication Sciences, Research group: TUT Game Lab, University of Oulu, Oulu University Hospital, VTT Technical Research Centre of Finland
Contributors: Jansson, M., Koivisto, J., Pikkarainen, M.
Number of pages: 14
Pages: 2338-2351
Publication date: 2020
Peer-reviewed: Yes

Publication information

Journal: JOURNAL OF CLINICAL NURSING
Volume: 29
ISSN (Print): 0962-1067
Original language: English
ASJC Scopus subject areas: Nursing(all)
Keywords: arthroplasty, gamification, patient journey
DOIs:
10.1111/jocn.15246

Bibliographical note

DUPL=53502910
Source: Scopus
Source ID: 85083088167
Research output: Contribution to journal › Article › Scientific › peer-review

Metabolic syndrome is associated with decreased heart rate variability in a sex-dependent manner: a comparison between 252 men and 249 women

Impaired heart rate variability (HRV) is associated with increased risk of cardiovascular disease, but evidence regarding alterations of HRV in metabolic syndrome (MetS) remains elusive. In order to examine HRV in MetS, we subjected 501 volunteers without atherosclerosis, diabetes or antihypertensive medication, mean age 48 years, to passive head-up tilt. The subjects were divided to control men (n = 131), men with MetS (n = 121), control women (n = 191) and women with MetS (n = 58) according to the criteria by Alberti et al. (Circulation, 2009, 120, 1640). In unadjusted analyses (i) men and women with MetS had lower total power and high-frequency (HF) power of HRV than controls whether supine or upright (P<0·05 for all). (ii) Supine low-frequency (LF) power of HRV was lower in men (P = 0·012) but not in women (P = 0·064) with MetS than in controls, while men and women with MetS had lower upright LF power of HRV than controls (P <0·01 for both). (iii) The LF:HF ratio did not differ between subjects with and without MetS. After adjustment for age, smoking habits, alcohol intake, height, heart rate and breathing frequency, only the differences in upright total power and HF power of HRV between women with MetS and control women remained significant (P<0·05). In conclusion, reduced total and HF power of HRV in the upright position may partially explain why the relative increase in cardiovascular risk associated with MetS is greater in women than in men. Additionally, the present results emphasize that the confounding factors must be carefully taken into consideration when evaluating HRV.

General information

Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Physiological Measurement Systems and Methods Group, Tampere University Hospital, Central Hospital of Seinäjoki
Contributors: Kangas, P., Tikkakoski, A., Uitto, M., Viik, J., Bouquin, H., Niemelä, O., Mustonen, J., Pörsti, I.
Number of pages: 8
Pages: 160-167
Publication date: Mar 2019
Peer-reviewed: Yes
Early online date: 2018

Publication information

Journal: Clinical Physiology and Functional Imaging
Volume: 39
Issue number: 2
ISSN (Print): 1475-0961
Ratings:

Scopus rating (2019): CiteScore 4.4 SJR 0.659 SNIP 0.866
Original language: English
ASJC Scopus subject areas: Physiology, Physiology (medical)
Keywords: cardiac autonomic tone, cardiovascular risk, head-up tilt, obesity, sex
DOIs:

10.1111/cpf.12551
Source: Scopus
Source ID: 85054818066
Research output: Contribution to journal › Article › Scientific › peer-review

Effect of Implant Coating on Wireless Powering for Intracranial Pressure Monitoring System

A fully wireless implantable system can be used for long-term monitoring of intracranial pressure. In this type of system, an implant is placed under the skull and monitored pressure is transmitted wirelessly outside the skull. Moreover, the implant is powered through an inductive coupling. To avoid any infection and damage to the implant, the implant should be coated with biocompatible material. In this paper, we investigate the impact of coating on the maximum wireless link power efficiency through simulations in anatomical and layered tissue head models and present test results.

General information

Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Wireless Identification and Sensing Systems Research Group
Contributors: Khan, W., Rizwan, M., Behfar, M., Sydänheimo, L., Björninen, T., Ukkonen, L.
Number of pages: 2
Publication date: 10 Jul 2017

Host publication information

Title of host publication: Proceedings of 2017 IEEE AP-S/URSI

Publisher: IEEE
ISBN (Electronic): 978-1-5386-3284-0

Publication series
Name: Digest of the IEEE Antennas and Propagation Society International Symposium
ISSN (Electronic): 1947-1491
Electronic versions:
APS2017
DOIs:
10.1109/APUSNCURSINRSM.2017.8072237
URLs:
http://urn.fi/URN:NBN:fi:tty-201801091041
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Short- and Long-Range Correlations in Beat Rate Variability of Human Pluripotent-Stem-Cell-Derived Cardiomyocytes
A healthy heart exhibits fractal, i.e., long-range correlated fluctuations in heart rate variability (HRV). It is recently shown that fractal dynamics is also an intrinsic feature of human-induced pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs). In this study, we investigate short- and long-range correlations in beat rate variability (BRV) of hiPSC-CMs, obtained from a healthy subject and symptomatic and asymptomatic long QT syndrome patients. It is shown that it is important to distinguish correlation properties in short and long time scales, as the scaling exponents are significantly different and also behave differently in the acute exposure to pharmacological compounds that modulate β1-adrenoreceptors and cardiac ion channel generating delayed, outwardly rectifying K+ current (IKs). While long-range scaling is sensitive to the drug exposure, short-range scaling is barely affected.

General information
Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Physics, Research area: Computational Physics, Research group: Quantum Control and Dynamics, Institute of Biomedical Technology and BioMediTech, Heart Group, BioMediTech Institute and Faculty of Medicine and Life Science, University of Tampere, The Heart Center, Tampere University Hospital
Contributors: Kim, J., Kuusela, J., Aalto-Setälä, K., Räsänen, E.
Number of pages: 4
Publication date: 2017

Host publication information
Title of host publication: Computing in Cardiology 2017
Volume: 44

Publication series
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ISSN (Print): 2325-8861
Electronic versions:
Short- and Long-Range Correlations in Beat Rate
DOIs:
10.22489/CinC.2017.207-155
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http://urn.fi/URN:NBN:fi:tuni-202003092615
URLs:
http://www.cinc.org/archives/2017/

Bibliographical note
DUPL=42741204
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Prevalence of alcohol use disorders in schizophrenia - A systematic review and meta-analysis
Objective: Our aim was to present recent studies of alcohol use disorders (AUDs) in patients with schizophrenia, estimate overall prevalence and characteristics affecting the prevalence of AUDs. Method: We conducted a search using three literature databases and a manual search on articles published in 1996-2008. Meta-regression was used to study how prevalence is affected by different study characteristics. Articles that reported diagnoses according to DSM or ICD diagnostic systems were included. Results: Altogether 60 studies met our criteria. The median of current AUD prevalence was 9.4% (inter-quartile range, IQR 4.6-19.0, 18 studies) and median of lifetime AUD prevalence 20.6% (IQR 12.0-34.5, 47 studies). In studies using DSM-III-R median prevalence was higher than that in studies using DSM-IV, ICD-9 or ICD-10 (32/17/11/6%). Conclusion: Approximately every fifth patient with schizophrenia had lifetime AUD diagnosis. When contrasted with the most recent review, there might be a descending trend in AUD prevalence in patients with

schizophrenia.

General information
Publication status: Published
MoE publication type: A2 Review article in a scientific journal
Organisations: Department of Psychiatry, University of Oulu, University Central Hospital Kuopio, Academy of Finland
Contributors: Koskinen, J., Löhönen, J., Koponen, H., Isohanni, M., Miettunen, J.
Number of pages: 12
Pages: 85-96
Publication date: 1 Aug 2009
Peer-reviewed: Yes

Publication information
Journal: ACTA PSYCHIATRICA SCANDINAVICA
Volume: 120
Issue number: 2
ISSN (Print): 0001-690X
Ratings:

Scopus rating (2009): SJR 2.015 SNIP 1.753
Original language: English
ASJC Scopus subject areas: Psychiatry and Mental health
Keywords: Alcohol, Schizophrenia, Substance use disorders
DOIs:

10.1111/j.1600-0447.2009.01385.x

Bibliographical note
EXT="Löhönen, Johanna"
Source: Scopus
Source ID: 67649979716
Research output: Contribution to journal › Review Article › Scientific › peer-review

Rate of cannabis use disorders in clinical samples of patients with schizophrenia: A meta-analysis
Objective: Our aim was to review recent studies and estimate the rate of cannabis use disorders (CUDs) in schizophrenia, as well as to examine the factors affecting this rate. Methods: We conducted an electronic search of 3 literature databases and a manual search of articles from 1996 to 2008. The key words used were "schizophreni*," "psychos*s," "psychotic," "cannabis abuse," "cannabis dependence," "cannabis use disorder," "substance use disorder," "substance abuse," "substance dependence," and "dual diagnosis." Articles that reported diagnoses according to the Diagnostic and Statistical Manual of Mental Disorders or International Classification of Diseases were included. Regression analysis was used to examine how estimated rates of CUDs are affected by various study characteristics such as the classification system, inpatient vs outpatient status, study location, proportion of males, age of the sample, or duration of illness. Results: Thirtyfive studies met our search criteria. The median current rate of CUDs was 16.0% (interquartile range [IQR] 5 8.6-28.6, 10 studies), and the median lifetime rate was 27.1% (IQR 5 12.2-38.5, 28 studies). The median rate of CUDs was markedly higher in first-episode vs long-term patients (current 28.6%/22.0%, lifetime 44.4%/12.2%, respectively) and in studies where more than two-thirds of the participants were males than in the other studies (33.8%/13.2%). CUDs were also more common in younger samples than in the others (current 38.5%/16.0%, lifetime 45.0%/17.9%). Conclusions: Approximately every fourth schizophrenia patient in our sample of studies had a diagnosis of CUDs. CUDs were especially common in younger and first-episode patient samples as well as in samples with a high proportion of males.

General information
Publication status: Published
MoE publication type: A2 Review article in a scientific journal
Organisations: University of Oulu, University of Eastern Finland, Academy of Finland
Contributors: Koskinen, J., Löhönen, J., Koponen, H., Isohanni, M., Miettunen, J.
Number of pages: 16
Pages: 1115-1130
Publication date: 1 Nov 2010
Peer-reviewed: Yes

Publication information
Journal: SCHIZOPHRENIA BULLETIN
Volume: 36
Issue number: 6
ISSN (Print): 0586-7614
Ratings:

Scopus rating (2010): SJR 4.22 SNIP 2.404

Original language: English
ASJC Scopus subject areas: Psychiatry and Mental health
Keywords: Cannabis abuse, Cannabis dependence, Comorbidity, Dual diagnosis, Schizophrenia spectrum, Substance use disorders
DOIs:

10.1093/schbul/sbp031

Bibliographical note
EXT="Löhönen, Johanna"
Source: Scopus
Source ID: 78650154703
Research output: Contribution to journal › Review Article › Scientific › peer-review

Evaluation of printed P(VDF-TrFE) pressure sensor signal quality in arterial pulse wave measurement
In this contribution, we evaluate the performance of an additively fabricated piezoelectric poly(vinylidenefluoride-cotrifluoroethylene) (P(VDF-TrFE)) based dynamic pressure sensor in non-invasive arterial pulse wave (PW) measurement. Additively fabricated piezoelectric sensors have high potential for the realization of affordable and unobtrusive PW measurement systems which could enable the long-term monitoring of patients with cardiovascular diseases (CVDs). However, the accuracy and reliability of such sensors have not been extensively studied before. We propose an additive fabrication process for a P(VDF-TrFE) PW-sensor, measure PW from the radial artery at the wrist from 22 healthy volunteer subjects, calculate clinically relevant parameters based on the PW waveform and compare their values to the values obtained from concurrent measurement with an electromechanical film (EMFi) based reference sensor, used earlier in several clinical studies. We show that the signals recorded with the two sensors, as well as the radial augmentation index (rAIx) and the stiffness index (SI) calculated from them, are in good agreement with each other. These results demonstrate that the additively fabricated P(VDF-TrFE) PW sensors can reach a suitable level of accuracy and reliability for clinical use.

General information
Publication status: E-pub ahead of print
MoE publication type: A1 Journal article-refereed
Organisations: Electrical Engineering, BioMediTech, Tampere University Hospital, Finnish Cardiovascular Research Center, Tampere University of Applied Sciences
Contributors: Laurila, M., Peltokangas, M., Lozano Montero, K., Siponkoski, T., Juuti, J., Tuukkanen, S., Oksala, N., Vehkaoja, A., Mäntysalo, M.
Publication date: 15 Aug 2019
Peer-reviewed: Yes

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Journal: IEEE Sensors Journal
ISSN (Print): 1530-437X
Ratings:

Scopus rating (2019): CiteScore 6.2 SJR 0.749 SNIP 1.659
Original language: English
Keywords: Dynamic pressure sensor, Piezoelectric sensor, Printed sensor, Pulse wave measurement, CVD, Pulse wave analysis
Electronic versions:

08796416
DOIs:

10.1109/JSEN.2019.2934943
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http://urn.fi/URN:NBN:fi:tuni-201909273556

Bibliographical note
INT=elen,"Lozano Montero, Karem"
Research output: Contribution to journal › Article › Scientific › peer-review

Health figures: an open source JavaScript library for health data visualization
Background
The way we look at data has a great impact on how we can understand it, particularly when the data is related to health and wellness. Due to the increased use of self-tracking devices and the ongoing shift towards preventive medicine, better understanding of our health data is an important part of improving the general welfare of the citizens. Electronic Health Records, self-tracking devices and mobile applications provide a rich variety of data but it often becomes difficult to understand. We implemented the hFigures library inspired on the hGraph visualization with additional improvements. The purpose of the library is to provide a visual representation of the evolution of health measurements in a complete and useful manner.

Results
We researched the usefulness and usability of the library by building an application for health data visualization in a health coaching program. We performed a user evaluation with Heuristic Evaluation, Controlled User Testing and Usability Questionnaires. In the Heuristics Evaluation the average response was 6.3 out of 7 points and the Cognitive Walkthrough done by usability experts indicated no design or mismatch errors. In the CSUQ usability test the system obtained an average score of 6.13 out of 7, and in the ASQ usability test the overall satisfaction score was 6.64 out of 7.

Conclusions
We developed hFigures, an open source library for visualizing a complete, accurate and normalized graphical representation of health data. The idea is based on the concept of the hGraph but it provides additional key features, including a comparison of multiple health measurements over time. We conducted a usability evaluation of the library as a key component of an application for health and wellness monitoring. The results indicate that the data visualization library was helpful in assisting users in understanding health data and its evolution over time

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Research group: Personal Health Informatics-PHI, Tampere University of Technology
Contributors: Ledesma, A., Al-Musawi, M., Nieminen, H.
Publication date: 22 Mar 2016
Peer-reviewed: Yes

Publication information
Journal: BMC Medical Informatics and Decision Making
Volume: 16
Issue number: 1
Article number: 38
ISSN (Print): 1472-6947
Ratings:

Scopus rating (2016): CiteScore 4.2 SJR 1.066 SNIP 1.22
Original language: English
Keywords: Data visualization, Health data, Health informatics, Javascript
Electronic versions:

hFiguresLedesmaEtAl
DOIs:

10.1186/s12911-016-0275-6
URLs:

http://urn.fi/URN:NBN:fi:tty-201603243765
Research output: Contribution to journal › Article › Scientific › peer-review

Levosimendan alone and in combination with valsartan prevents stroke in Dahl salt-sensitive rats
The effects of levosimendan on cerebrovascular lesions and mortality were investigated in models of primary and secondary stroke. We aimed to determine whether the effects of levosimendan are comparable to and/or cumulative with those of valsartan, and to investigate whether levosimendan-induced vasodilation has a role in its effects on stroke. In a primary stroke Dahl/Rapp rat model, mortality rates were 70% and 5% for vehicle and levosimendan, respectively. Both stroke incidence (85% vs. 10%, P<0.001) and stroke-associated behavioral deficits (7-point neuroscore: 4.59 vs. 5.96, P<0.001) were worse for vehicle compared to levosimendan. In a secondary stroke model in which levosimendan treatment was started after cerebrovascular incidences were already detected, mean survival times were 15 days with vehicle, 20 days with levosimendan (P=0.025, vs. vehicle), 22 days with valsartan (P=0.001, vs. vehicle), and 31 days with levosimendan plus valsartan (P<0.001, vs. vehicle). The respective survivals were 0%, 16%, 20% and 59%, and the respective incidences of severe lesions were 50%, 67%, 50% and 11%. In this rat model, levosimendan increased blood volume of the cerebral vessels, with significant effects in the microvessels of the cortex (ΔR=3.5±0.15 vs. 2.7±0.17ml for vehicle; P=0.001) and hemisphere (ΔR=3.2±0.23 vs. 2.6±0.14ml for vehicle; P=0.018). Overall, levosimendan significantly reduced stroke-induced mortality and morbidity, both alone and with valsartan, with apparent cumulative effects, an activity in which the vasodilatory effects of levosimendan have a role.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Department of Signal Processing, Tampere University of Technology
Contributors: Levijoki, J., Kivikko, M., Pollesello, P., Sallinen, J., Hyttilä-Hopponen, M., Kuoppamäki, M., Haasio, K., Gröhn, O., Miettinen, R., Puoliväli, J., Tähtivaara, L., Yrjänheikki, J., Haapalinna, A.
Number of pages: 9

Pages: 132-40
Publication date: 5 Mar 2015
Peer-reviewed: Yes

Publication information
Journal: European Journal of Pharmacology
Volume: 750
ISSN (Print): 0014-2999
Ratings:
Scopus rating (2015): CiteScore 4.6 SJR 1.122 SNIP 1.016
Original language: English
Keywords: Animals, Blood Pressure, Blood Volume, Brain, Drug Interactions, Hydrazones, Male, Pyridazines, Rats, Rats, Inbred Dahl, Stroke, Valsartan, Vasodilator Agents, Journal Article, Research Support, Non-U.S. Gov't
DOIs:
10.1016/j.ejphar.2015.01.037

Bibliographical note
INT=sgn,"Miettinen, Riitta"
Source: PubMed
Source ID: 25641751
Research output: Contribution to journal › Article › Scientific › peer-review

Examining service experiences: comparing methods to capture children's experiences

Purpose – Recent discussion on the service-dominant logic (SDL) and interest of studying service experiences in different contexts have been increased. However, this has brought up a new methodological challenge for contemporary research. Research methods used, need to capture experiences in the contexts of value co-creation while taking dimensions affecting to experience co-creation into account. This challenges researchers to adapt their methodology to be suitable for the context of studied phenomenon. This paper will provide a set of methodological snapshots applicable for SDL and service research in a context of healthcare services for children and their families.
Design/Methodology/approach – Study draws on selected literature from the fields of service research and healthcare services and tests new methods of capturing experiences in a special experience context of children's healthcare. We analyze and report a set empirical studies applying of qualitative and quantitative approaches for investigating experience in a special research field of children's healthcare experience. These methodological approaches include probing, structured and unstructured interviews and surveys. We review and compare the key characteristics of the methods and their respective benefits for service experience research.
Findings – Key findings shows that some research methods are more appropriate capturing children's experience data. Study also suggest that some methods are more appropriate for capturing data of co-creation in children's social contexts..
Research implications – The paper builds contribution by increasing understanding on how different research methods capture dimensions of service experience co-creation and help researchers interested in studying children's experiences to select an appropriate methodology for conducting their research.
Originality/value – Service experience research lacks paper that pieces together different methodology approaches capturing complex phenomenon of children's experiences.
Key words methodology, children's experiences, service experience, healthcare
Paper type – Research paper

General information
Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Industrial and Information Management, Research group: Center for Innovation and Technology Research , Research group: Center for Innovation and Technology Research, Aalto University, School of Science, Department of Computer Science
Contributors: Litovuo, L., Aarikka-Stenroos, L., Kaipio, J., Karisalmi, N.
Number of pages: 20
Publication date: 9 Jun 2017

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Publisher: SIMAS di Salerno for Naples Forum on Service
Editors: Gummesson, E., Mele, C., Polese, F.
ISBN (Electronic): 978-88-92667-57-0
Keywords: methodology, children's experiences, service experience, healthcare, experience
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URLs:

http://www.naplesforumonservice.it/uploads//files/Litovuo%2C%20Aarikka-Stenroos%2C%20Kaipio%2C%20Karisalmi.pdf
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Ecosystem approach on medical game development: The relevant actors, value propositions and innovation barriers
This paper explores the medical game ecosystem and reveals the reciprocal value propositions of the relevant actors of medical game ecosystems, as well as barriers that may be complicating or hindering realization of the value propositions. The case comprises an emerging medical game ecosystem in Finland in the traumatic brain injury (TBI) rehabilitation context. This study presents 12 actor groups, their value propositions, and the barriers between the actors. This paper gives a comprehensive view of the actual medical game ecosystem that is needed to utilize the full potential of gamification and serious games in the health care sector

General information
Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Industrial and Information Management, Research group: Center for Innovation and Technology Research , University of Vaasa
Contributors: Litovuo, L., Makkonen, H., Aarikka-Stenroos, L., Luhtala, L., Mäkinen, S.
Number of pages: 10
Publication date: 20 Sep 2017

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Title of host publication: Association for Computing Machinery, ACM : AcademicMindtrek'17, Sept. 20th-21st, 2017 Tampere Hall, Tampere, Finland
Place of publication: Tampere, Finland
Publisher: ACM Press
ISBN (Electronic): 978-1-4503-5426-4
Keywords: medical game, health care, ecosystem, value proposition, Innovation barrier
DOIs:
10.1145/3131085.3131104
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Coverage of the bibliographic databases in mental health research
Background: Electronic bibliographic databases are important tools when searching for medical information. The selected databases have an important effect on the potential results achieved. Studies about comparison of databases provide useful information to help determine which databases or set of databases are useful for a particular topic. Aims: The aim of this study is to examine the coverage and overlap of three commonly used databases in mental health research. Methods: We performed systematic database searches on four topics (ADHD prevalence, schizotypal personality, brain MRI studies in schizophrenia, recovery in schizophrenia) in three databases (PubMed, Web of Science and PsycINFO). We also studied the effect of publication year and language on database coverage. Results: PubMed was the most comprehensive database in ADHD (85% coverage of total results of the three databases) and MRI studies (71%), whereas PsycINFO was most effective in recovery (62%) and schizotypal personality (72%). The most comprehensive combination of two databases found 77–94% of the articles on the different topics. Publication year and language affected the coverage in some cases. Conclusions: When choosing databases, the extent of coverage and topic should be taken into account, as there is no single database that covers all information needs. In the case of interdisciplinary topics, the Web of Science or PsycINFO should be considered; PsycINFO should be included especially on topics related to psychology. The use of several relevant bibliographic databases, including others than those used here, is recommended.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: University of Oulu
Contributors: Löhönen, J., Isohanni, M., Nieminen, P., Miettunen, J.
Pages: 181-188
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: NORDIC JOURNAL OF PSYCHIATRY
Volume: 64
Issue number: 3
ISSN (Print): 0803-9488
Ratings:
Scopus rating (2010): SJR 0.505 SNIP 0.599
Original language: English

DOIs:
10.3109/08039480903337378

Bibliographical note
EXT="Löhönen, Johanna"
Research output: Contribution to journal › Article › Scientific › peer-review

A guide for medical information searches of bibliographic databases - psychiatric research as an example
Information overload, demanding work with strict time limits, and the extensive number of medical bibliographic databases and other research sources all underline the importance of being able to search for up-to-date information effectively. Medical journals play a key role in providing access to the latest information in medicine and health and bibliographic databases play an important role in accessing them. This paper sheds light on the role of the information search process and discusses how to approach key medical bibliographic databases and information sources, using the field of psychiatry as an example. Because of an increasing amount of information, the constant renewal within the discipline and a variety of services available, those seeking information must precisely define what kind of information they are looking for and from which sources the information needed may be found.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: University of Oulu
Contributors: Löhönen, J., Isohanni, M., Nieminen, P., Miettunen, J.
Number of pages: 11
Pages: 394-404
Publication date: 15 Oct 2009
Peer-reviewed: Yes

Publication information
Journal: INTERNATIONAL JOURNAL OF CIRCUMPOLAR HEALTH
Volume: 68
Issue number: 4
ISSN (Print): 1239-9744
Ratings:
Scopus rating (2009): SJR 0.452 SNIP 0.359
Original language: English
ASJC Scopus subject areas: Public Health, Environmental and Occupational Health, Epidemiology, Health(social science)
Keywords: Bibliographic databases, Information search, Information sources, Medicine, Psychiatry
DOIs:
0.3402/ijch.v68i4.17366

Bibliographical note
EXT="Löhönen, Johanna"
Source: Scopus
Source ID: 70349817307
Research output: Contribution to journal › Article › Scientific › peer-review

Porous polymer tubes for urethral tissue engineering
Hypospadias is a condition where the opening of the urethra is abnormally situated. It is one of the most common congenital anomalies affecting one in 200 to 300 male children. The most severe cases require urethral reconstruction and every other of these operations leads to complications. In this study porous polymer tubes are designed for repairing large urethral defects. The tubes are made from polylactide (PLA) and polybutylene succinate (PBS) as well as two blends (PLA/PBS 75/25 blend and a 50/50 blend). The structure is made porous with supercritical carbon dioxide. The main aim is to create a suitable porous structure to enable the formation of an impermeable epithelium and allowing the surrounding tissue to partially grow inside the tubes anchoring it to its place. The morphology of the tubes was observed with optical microscope and the porosity was characterized with microcomputed tomography. The results are promising and suggest that these novel replacements are promising alternatives for urethral tissue engineering.

General information
Publication status: Published
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Biomaterials and Tissue Engineering Group
Contributors: Lyyra, I., Hannula, M., Paakinaho, K., Kellomäki, M.
Publication date: 25 Nov 2016
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Event: Paper presented at BioMediTech Research Day 2016, Tampere, Finland.
Keywords: Urethra, biomaterials, tissue engineering, supercritical carbon dioxide
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Research output: Other conference contribution › Paper, poster or abstract › Scientific

Glass and Glass-Ceramic Scaffolds: Manufacturing Methods and the Impact of Crystallization on In-Vitro Dissolution

General information
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MoE publication type: A3 Part of a book or another research book
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Biomaterials and Tissue Engineering Group
Contributors: Nommeots-Nomm, A., Massera, J.
Number of pages: 19
Publication date: 2017

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Title of host publication: Scaffolds in Tissue Engineering - Materials, Technologies and Clinical Applications
Publisher: InTech Open Access Publisher
ISBN (Electronic): 978-953-51-3642-2
Electronic versions:

56625
DOIs:

10.5772/intechopen.70242
URLs:

http://urn.fi/URN:NBN:fi:tty-201801091057
Research output: Chapter in Book/Report/Conference proceeding › Chapter › Scientific › peer-review

Modeling and Engineering Promoters with Pre-defined RNA Production Dynamics in Escherichia Coli
Recent developments in live-cell time-lapse microscopy and signal processing methods for single-cell, single-RNA detection now allow characterizing the in vivo dynamics of RNA production of Escherichia coli promoters at the single event level. This dynamics is mostly controlled at the promoter region, which can be engineered with single nucleotide precision. Based on these developments, we propose a new strategy to engineer genes with predefined transcription dynamics (mean and standard deviation of the distribution of RNA numbers of a cell population). For this, we use stochastic modelling followed by genetic engineering, to design synthetic promoters whose rate-limiting steps kinetics allow achieving a desired RNA production kinetics. We present an example where, from a pre-defined kinetics, a stochastic model is first designed, from which a promoter is selected based on its rate-limiting steps kinetics. Next, we engineer mutant promoters and select the one that best fits the intended distribution of RNA numbers in a cell population. As the modelling strategies and databases of models, genetic constructs, and information on these constructs kinetics improve, we expect our strategy to be able to accommodate a wide variety of pre-defined RNA production kinetics.

General information
Publication status: Published
MoE publication type: A4 Article in a conference publication
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Laboratory of Biosystem Dynamics-LBD , Research group: Computational Systems Biology
Contributors: Oliveira, S. M. D., Bahrudeen, M. N. M., Startceva, S., Kandavalli, V., Ribeiro, A. S.
Number of pages: 18
Pages: 3-20
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Publisher: Springer Verlag
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Name: Lecture Notes in Bioinformatics
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ISSN (Print): 0302-9743

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ASJC Scopus subject areas: Theoretical Computer Science, Computer Science(all)
Keywords: Gene engineering framework, Model of transcription initiation, Rate-limiting steps, Synthetic constructs
Electronic versions:

Oliveira2018 Modeling and engineering
DOIs:

10.1007/978-3-319-99429-1_1
URLs:

http://urn.fi/URN:NBN:fi:tuni-201911186030
Source: Scopus
Source ID: 85053213051
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

Large-Scale Simulation of the Phenotypical Variability Induced by Loss-of-Function Long QT Mutations in Human Induced Pluripotent Stem Cell Cardiomyocytes

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Computational Biophysics and Imaging Group, University of Bologna
Contributors: Paci, M., Casini, S., Bellin, M., Hyttinen, J., Severi, S.
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: International Journal of Molecular Sciences
Volume: 19
Issue number: 11
ISSN (Print): 1422-0067
Ratings:

Scopus rating (2018): CiteScore 5.2 SJR 1.312 SNIP 1.274
Original language: English
Electronic versions:

ijms-19-03583
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10.3390/ijms19113583
URLs:

http://urn.fi/URN:NBN:fi:tty-201901071021
Research output: Contribution to journal › Article › Scientific › peer-review

Biomaterials for Electronics
Challenges of climate change, ecological scarcity and depletion of natural resources form a global push towards a bioeconomy, which means shifting from fossil to renewable raw materials. Wood biomass will likely get a significant role in the Finnish bioeconomy. Finnish economy has conventionally focused on bulk products, while the challenge in the future is to bring high added value to the fibre based components and products. Cellulose based nanomaterials are low-cost, strong, porous, lightweight, solution processable, biocompatible, biodegradable and piezoelectric biomaterials, which have obvious applications for example in biomedical and electronic applications.

Piezoelectric sensors are widely applicable for various healthcare and well-being applications. We have recently studied flexible piezoelectric sensors made from commercial PVDF films and printable PVDF-TrFE ink, as well as biodegradable films from wood-based cellulose nanofibrils (CNF) [1] and bacterial cellulose (BC).

The high porosity of CNF makes it also a promising material for supercapacitors, also known as electrochemical double-layer capacitors (EDLC). We have recently demonstrated the fabrication of supercapacitor electrodes from a mixture of CNF and dandelion using high temperature pyrolysis.

References:
[1] S. Rajala, T. Siponkoski, E. Sarlin, M. Mettänen, M. Vuoriluoto, A. Pammo, J. Juuti, O. J. Rojas, S. Franssila, and S. Tuukkanen. ”Cellulose nanofibril film as a piezoelectric sensor material”. ACS Appl. Mater. Interfaces 8(24) (2016) 15607.

General information
Publication status: Published

Organisations: Faculty of Biomedical Sciences and Engineering, Department of Automation Science and Engineering, Research area: Microsystems, Research area: Measurement Technology and Process Control, University of Twente, Faculty of Biomedical Sciences and Engineering, Tampere University of Technology
Contributors: Pammo, A., Schouten, M., Virtanen, J., Tuukkanen, S.
Number of pages: 1
Pages: 1-1
Publication date: 25 Nov 2016
Peer-reviewed: Unknown
Event:
ASJC Scopus subject areas: Biomaterials, Materials Science(all), Electrical and Electronic Engineering
Keywords: biomaterial, piezoelectric sensor, nanocellulose, bacterial cellulose, supercapacitor, PVDF-TrFE
Research output: Other conference contribution › Paper, poster or abstract › Scientific

Yard vegetation is associated with gut microbiota composition

Gut microbes play an essential role in the development and functioning of the human immune system. A disturbed gut microbiota composition is often associated with a number of health disorders including immune-mediated diseases. Differences in host characteristics such as ethnicity, living habit and diet have been used toexplain differences in the gut microbiota composition in inter-continental comparison studies. As our previousstudies imply that daily skin contact with organic gardening materials modify gut microflora, here we investigated the association between living environment and gut microbiota in a homogenous western populationalong an urban-rural gradient. We obtained stool samples from 48 native elderly Finns in province Häme in August and November 2015 and identified the bacterial phylotypes using 16S rRNA Illumina MiSeq sequencing. Weassumedthat yardvegetation and landcoverclassessurroundinghomesexplain thestool bacterial communityingeneralized linear mixed models. Diverse yard vegetation was associated with a reduced abundance of Clostridiumsensu stricto and an increased abundance ofFaecalibacteriumand Prevotellaceae. The abundance ofBacteroideswas positively and strongly associated with the built environment. Exclusion of animal owners didnot alter the main associations. These results suggest that diverse vegetation around homes is associated withhealth-related changes in gut microbiota composition. Manipulation of the garden diversity, possibly jointlywith urban planning, is a promising candidate for future intervention studies that aim to maintain guthomeostasis.

General information

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MoE publication type: A1 Journal article-refereed
Organisations: Architecture, Research group: Urban Planning and Design, Charles University Prague / Univerzita Karlova V Praze, Tampere University, Päijät-Häme Central Hospital, University of Helsinki, University of Helsinki, Tampere University, University of Tampere
Contributors: Parajuli, A., Hui, N., Puhakka, R., Oikarinen, S., Grönroos, M., Selonen, V. A., Siter, N., Kramna, L., Roslund, M. I., Vari, H. K., Nurminen, N., Honkanen, H., Hintikka, J., Sarkkinen, H., Romantschuk, M., Kauppi, M., Valve, R., Cinek, O., Laitinen, O. H., Rajaniemi, J., Hyöty, H., Sinkkonen, A.
Number of pages: 8
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Volume: 713
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URLs:

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Bibliographical note

dupl=51708703
Research output: Contribution to journal › Article › Scientific › peer-review

Cerebellar Purkinje cells control eye movements with a rapid rate code that is invariant to spike irregularity

The rate and temporal pattern of neural spiking each have the potential to influence computation. In the cerebellum, it has been hypothesized that the irregularity of interspike intervals in Purkinje cells affects their ability to transmit information to downstream neurons. Accordingly, during oculomotor behavior in mice and rhesus monkeys, mean irregularity of Purkinje cell spiking varied with mean eye velocity. However, moment-to-moment variations revealed a tight correlation between

eye velocity and spike rate, with no additional information conveyed by spike irregularity. Moreover, when spike rate and irregularity were independently controlled using optogenetic stimulation, the eye movements elicited were well-described by a linear population rate code with 3–5 ms temporal precision. Biophysical and random-walk models identified biologically realistic parameter ranges that determine whether spike irregularity influences responses downstream. The results demonstrate cerebellar control of movements through a remarkably rapid rate code, with no evidence for an additional contribution of spike irregularity.

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Organisations: BioMediTech, Research group: Computational Neuro Science-CNS, University of Rochester, USA, QIMR Berghofer Medical Research Institute, Department of Neurobiology, Stanford University, California, USA
Contributors: Payne, H. L., French, R. L., Guo, C. C., Nguyen-Vu, T. D. B., Manninen, T., Raymond, J. L.
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Volume: 8
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ISSN (Print): 2050-084X
Ratings:

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Original language: English
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Payne2019
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10.7554/eLife.37102
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http://urn.fi/URN:NBN:fi:tty-201905101533
Research output: Contribution to journal › Article › Scientific › peer-review

Fully-automated quantitative estimation of volumetric breast density from digital breast tomosynthesis images

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Former organisation of the author
Contributors: Pertuz, S., McDonald, E., Weinstein, S., Conant, E., Kontos, D.
Pages: 65-74
Publication date: Apr 2016
Peer-reviewed: Yes

Publication information
Journal: Radiology
Volume: 279
Issue number: 1
ISSN (Print): 0033-8419
Ratings:

Scopus rating (2016): CiteScore 12.5 SJR 3.56 SNIP 2.811
Original language: English
DOIs:

10.1148/radiol.2015150277
Research output: Contribution to journal › Article › Scientific › peer-review

The influence of foodstuff grouping on doses in safety assessments

General information
Publication status: Published
MoE publication type: D3 Professional conference proceedings
Organisations: Signal Processing, Research group: Data-analytics and Optimization, EnviroCase, Ltd
Contributors: Pohjola, J., Turunen, J., Lipping, T., Ikonen, A.
Publication date: 2016

Host publication information
Title of host publication: Ninth International Conference on Nuclear and Radiochemistry - Nrc9
Article number: P2-118
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Professional

Nonlinear Effects of Winter Swimming and Sauna Recreational Activities on the Heart Rate Variability
Sauna sessions and winter swimming are traditional and popular recreational activities in certain countries. Their positive effects on health and relaxation, both as separate and combined activities, are commonly reported. However, systematic studies of these effects are relatively scarce, especially regarding the nonlinear analysis of the physiological measurements of the heart activity. We performed Multi-Scale Entropy (MSE) and Detrended Fluctuation (DFA) analyses on the inter-beat time series (about 72 h long) of 21 healthy volunteers studied in three distinct contexts: winter swimming combined with sauna bathing (W), sauna bathing alone (S), and control (C) with no related activities. We confirmed that the scaling exponents (DFA) and complexity indices (determined from MSE) stay within the variation observed for healthy individuals as compared to public data sets. Next, we showed that S and W interventions have uncorrelated effects on the whole time series complexity in each individual. Additionally, the long-range scaling properties of S and W groups are not correlated as determined by DFA. Thus, we speculate that winter swimming combined with sauna bathing and sauna bathing alone might have different physiological responses.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Physics, Faculty of Biomedical Sciences and Engineering, Tampere Univ Technol, Tampere University of Technology, Lund Univ, Lund University
Contributors: Potapov, I., Haverinen, S., Smolander, J., Viik, J., Räsänen, E.
Number of pages: 4
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Journal: Computing in Cardiology
Volume: 44
ISSN (Print): 2325-8861
Ratings:
Scopus rating (2017): CiteScore 0.9 SJR 0.191 SNIP 0.361
Original language: English
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10.22489/CinC.2017.151-256

Bibliographical note
EXT="Smolander, Juhani"
Research output: Contribution to journal › Article › Scientific › peer-review

Feature-based analysis of mouse prostatic intraepithelial neoplasia in histological tissue sections
Prostatic intraepithelial neoplasia (PIN) represents premalignant tissue involving epithelial growth confined in the lumen of prostatic acini. In the attempts to understand oncogenesis in the human prostate, early neoplastic changes can be modeled in the mouse with genetic manipulation of certain tumor suppressor genes or oncogenes. As with many early pathological changes, the PIN lesions in the mouse prostate are macroscopically small, but microscopically spanning areas often larger than single high magnification focus fields in microscopy. This poses a challenge to utilize full potential of the data acquired in histological specimens. We use whole prostates fixed in molecular fixative PAXgene™, embedded in paraffin, sectioned through and stained with H&E. To visualize and analyze the microscopic information spanning whole mouse PIN (mPIN) lesions, we utilize automated whole slide scanning and stacked sections through the tissue. The region of interests is masked, and the masked areas are processed using a cascade of automated image analysis steps. The images are normalized in color space, after which exclusion of secretion areas and feature extraction is performed. Machine learning is utilized to build a model of early PIN lesions for determining the probability for histological changes based on the calculated features. We performed a feature-based analysis to mPIN lesions. First, a quantitative representation of over 100 features was built, including several features representing pathological changes in PIN, especially describing the spatial growth pattern of lesions in the prostate tissue. Furthermore, we built a classification model, which is able to align PIN lesions corresponding to grading by visual inspection to more advanced and mild lesions. The classifier allowed both determining the probability of early histological changes for uncategorized tissue samples and interpretation of the model parameters. Here, we develop quantitative image analysis pipeline to describe morphological changes in histological images. Even subtle changes in mPIN lesion characteristics can be described with feature analysis and machine learning. Constructing and using multidimensional feature data to represent histological changes enables richer analysis and interpretation of early pathological lesions.

General information
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MoE publication type: A1 Journal article-refereed
Organisations: Pori Department, Research group: Data-analytics and Optimization, Research group: Computational Systems Biology, BioMediTech, BioMediTech, University of Tampere
Contributors: Ruusuvuori, P., Valkonen, M., Nykter, M., Visakorpi, T., Latonen, L.
Publication date: 29 Jan 2016
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Journal: Journal of Pathology Informatics
Volume: 7
Issue number: 5
ISSN (Print): 2153-3539
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Scopus rating (2016): CiteScore 0.1
Original language: English
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Ruusuvuori et al. 2016
DOIs:

10.4103/2153-3539.175378
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http://urn.fi/URN:NBN:fi:tty-201612214893
Research output: Contribution to journal › Article › Scientific › peer-review

Porous poly-L-lactide-co-1-caprolactone scaffold: A novel biomaterial for vaginal tissue engineering
The surgical reconstruction of functional neovagina is challenging and susceptible to complications. Therefore, developing tissue engineering-based treatment methods for vaginal defects is important. Our aim was to develop and test a novel supercritical carbon dioxide foamed poly-L-lactide-co-1-caprolactone (scPLCL) scaffold for vaginal reconstruction. The scaffolds were manufactured and characterized for porosity (65 + 4%), pore size (350 + 150 mm) and elastic modulus (2.8 + 0.4 MPa). Vaginal epithelial (EC) and stromal cells (SC) were isolated, expanded and characterized with flow cytometry. Finally, cells were cultured with scPLCL scaffolds in separate and/or co-cultures. Their attachment, viability, proliferation and phenotype were analysed. Both cell types strongly expressed cell surface markers CD44, CD73 and CD166. Strong expression of CD326 was detected with ECs and CD90 and CD105 with SCs. Both ECs and SCs attached and maintained viability on scPLCL. Further, scPLCL supported the proliferation of especially ECs, which also maintained epithelial phenotype (cytokeratin expression) during 14-day assessment period. Interestingly, ECs expressed uroplakin (UP) Ia, UPIb and UPIII markers; further, UPIa and UPIII expression was significantly higher on ECs cultured on scPLCL than on cell culture plastic.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Biomaterials and Tissue Engineering Group, Research group: Computational Biophysics and Imaging Group, Tampere University Hospital
Contributors: Sartoneva, R., Kuismanen, K., Juntunen, M., Karjalainen, S., Hannula, M., Kyllönen, L., Hyttinen, J., Huhtala, H., Paakinaho, K., Miettinen, S.
Publication date: 1 Aug 2018
Peer-reviewed: Yes

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Journal: Royal Society Open Science
Volume: 5
Issue number: 8
Article number: 180811
ISSN (Print): 2054-5703
Ratings:

Scopus rating (2018): CiteScore 3 SJR 1.131 SNIP 1.095
Original language: English
ASJC Scopus subject areas: General
Keywords: Cell characterization, Neovagina, Poly-L-lactide-co-1-caprolactone, Vaginal epithelial cell, Vaginal stromal cell, Vaginal tissue engineering
Electronic versions:

180811.full
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URLs:

http://urn.fi/URN:NBN:fi:tty-201810162401
Source: Scopus
Source ID: 85053196533
Research output: Contribution to journal › Article › Scientific › peer-review

Katsaus vähähiilisyyden edistämiseen

General information
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MoE publication type: D4 Published development or research report or study
Organisations: Civil Engineering, Architecture
Contributors: Sorri, J., Edelman, H.
Number of pages: 56
Publication date: 2017

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Name: Tampereen teknillinen yliopisto. Rakennustekniikan laboratorio. Rakennustuotanto ja -talous. Raportti
Volume: 21
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URLs:

http://urn.fi/URN:ISBN:978-952-15-4024-0
Research output: Working paper › Discussion paper › Professional

Impact of Variable RNA-Sequencing Depth on Gene Expression Signatures and Target Compound Robustness: Case Study Examining Brain Tumor (Glioma) Disease Progression

Purpose: Gene expression profiling can uncover biologic mechanisms underlying disease and is important in drug development. RNA sequencing (RNA-seq) is routinely used to assess gene expression, but costs remain high. Sample multiplexing reduces RNAseq costs; however, multiplexed samples have lower cDNA sequencing depth, which can hinder accurate differential gene expression detection. The impact of sequencing depth alteration on RNA-seq-based downstream analyses such as gene expression connectivity mapping is not known, where this method is used to identify potential therapeutic compounds for repurposing.
Methods: In this study, published RNA-seq profiles from patients with brain tumor (glioma) were assembled into two disease progression gene signature contrasts for astrocytoma. Available treatments for glioma have limited effectiveness, rendering this a disease of poor clinical outcome. Gene signatures were subsampled to simulate sequencing alterations and analyzed in connectivity mapping to investigate target compound robustness.
Results: Data loss to gene signatures led to the loss, gain, and consistent identification of significant connections. The most accurate gene signature contrast with consistent patient gene expression profiles was more resilient to data loss and identified robust target compounds. Target compounds lost included candidate compounds of potential clinical utility in glioma (eg, suramin, dasatinib). Lost connections may have been linked to low-abundance genes in the gene signature that closely characterized the disease phenotype. Consistently identified connections may have been related to highly expressed abundant genes that were ever-present in gene signatures, despite data reductions. Potential noise surrounding findings included false-positive connections that were gained as a result of gene signature modification with data loss.
Conclusion: Findings highlight the necessity for gene signature accuracy for connectivity mapping, which should improve the clinical utility of future target compound discoveries.

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Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Predictive Society and Data Analytics (PSDA), Queen's University Belfast; Johns Hopkins University, Baltimore, MD., Queen's University of Belfast, Brain Tumour Research Centre, University of Bristol, Bristol, United Kingdom., Belfast Health and Social Care Trust, Belfast, United Kingdom., Tampere University of Technology, Korkeakoulunkatu 10, 33720 Tampere, Finland, Queen's University Belfast; Belfast Health and Social Care Trust, Belfast, United Kingdom.
Contributors: Stupnikov, A., O'Reilly, P. G., McInerney, C. E., Roddy, A. C., Dunne, P. D., Gilmore, A., Ellis, H. P., Flannery, T., Healy, E., McIntosh, S. A., Savage, K., Kurian, K. M., Emmert-Streib, F., Prise, K. M., Salto-Tellez, M., McArt, D. G.

Publication date: 13 Sep 2018
Peer-reviewed: Yes

Publication information
Journal: JCO precision oncology
Volume: 2
ISSN (Print): 2473-4284
Ratings:

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Original language: English
Electronic versions:

po.18.00014
DOIs:

10.1200/PO.18.00014
URLs:

http://urn.fi/URN:NBN:fi:tuni-201910224006
Source: PubMed
Source ID: 30324181
Research output: Contribution to journal › Article › Scientific › peer-review

Disposable Microfluidic Sensor Based on Nanocellulose for Glucose Detection
Point-of-care devices that are inexpensive, disposable, and environmentally friendly are becoming increasingly predominant in the field of biosensing and biodiagnostics. Here, microfluidics is a suitable option to endow portability and minimal reagent and material consumption. Nanocellulose is introduced to manufacture microfluidic channels and as a storage and immobilization compartment of glucose oxidase. Improved enzymatic activity retention is demonstrated in a simple and disposable point-of-care diagnostic unit that is able to detect glucose from fluid matrices at 0.1 mM concentration and in less than 10 min. It is concluded that the patterning and fluidic technologies that are possible with nanocellulose enable easily scalable multianalyte designs.

General information
Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Nanoscale Phenomena and Measurements (NPM), Research group: Sensor Technology and Biomeasurements (STB)
Contributors: Uddin, K. M. A., Jokinen, V., Jahangiri, F., Franssila, S., Rojas, O. J., Tuukkanen, S.
Number of pages: 6
Publication date: Feb 2019
Peer-reviewed: Yes
Early online date: 12 Nov 2018

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Journal: Global Challenges
Volume: 3
Issue number: 2
ISSN (Print): 2056-6646
Original language: English
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Electronic versions:

Uddin_et_al-2018-Global_Challenges
DOIs:

10.1002/gch2.201800079
URLs:

http://urn.fi/URN:NBN:fi:tty-201901111085
Source: RIS
Source ID: urn:5DCAE8AD3B0885AE0C73C44A3C1A3B43
Research output: Contribution to journal › Article › Scientific › peer-review

Foundational eHealth Curricula for the health care workforce
The European Union supported project EU*US eHealth work aims at developing the eHealth skills and competencies of the people working in health care. A part of this work is to develop curricula describing what the personnel should learn about the various aspects of eHealth.

General information

Publication status: Published
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Sleep and Sensory Signal Analysis Group-SSSAG, Research group: Personal Health Informatics-PHI
Contributors: Värri, A., Tolonen, J.
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Pages: 1-6
Publication date: 23 May 2017
Peer-reviewed: Unknown
Event: Paper presented at Sosiaali- ja terveydenhuollon ATK-päivät 2017, Helsinki, Finland.
ASJC Scopus subject areas: Computer Science(all), Health Professions(all)
Keywords: health informatics competency, health informatics skills, health informatics workforce, health informatics education, health information technology
Electronic versions:

Alpo_Johanna_FoundEHealthCurricula23052017v3
URLs:

https://koulutus.fcg.fi/Default.aspx?tabid=841

http://urn.fi/URN:NBN:fi:tty-201710122007
Research output: Other conference contribution › Paper, poster or abstract › Professional

The Digi-NewB project for preterm infant sepsis risk and maturity analysis

It is known from the literature that the careful analysis of the heart rate variability of a preterm infant can be used as a predictor of sepsis. The Digi-NewB project aims at collecting a database of at least 750 preterm infants including physiological signals, video and clinical observations. These data are used to design a decision support system for the early detection of sepsis and for the evaluation of the infant maturity. The preparation of the data for the exploratory analysis has turned out to be time-consuming. 190 infants have been recorded by March 2018 and of these, the R-R interval analysis of the ECG signals has been completed of 136 infants. The results of the project are still preliminary but seven heart rate variability parameters have been found to be different in preterm and full-term infants with a P value less than 0.01. The video analysis algorithm detecting the presence of personnel or relatives reached 96.8% of sensitivity and 95.1% of specificity.

General information

Publication status: Published
MoE publication type: A1 Journal article-refereed
Organisations: Research group: Personal Health Informatics-PHI, Research group: Sleep and Sensory Signal Analysis Group-SSSAG, Faculty of Biomedical Sciences and Engineering, Rennes University Hospital
Contributors: Värri, A., Kallonen, A., Helander, E., Ledesma Figueroa, A., Pladys, P.
Number of pages: 4
Pages: 330-333
Publication date: 2018
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Publication information

Journal: Finnish Journal of eHealth and eWelfare
Volume: 10
Issue number: 2-3
ISSN (Print): 1798-0798
Original language: English
ASJC Scopus subject areas: Health Informatics, Pediatrics, Perinatology, and Child Health
Keywords: decision support systems, artificial intelligence, preterm infant, sepsis risk, Health informatics
Electronic versions:

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DOIs:

10.23996/fjhw.69152
URLs:

http://urn.fi/URN:NBN:fi:tty-201806212016
Research output: Contribution to journal › Article › Scientific › peer-review

The Definition of Informatics Competencies in Finnish Healthcare and Social Welfare Education

Finland is a world leader in the use of public electronic services. Continuous improvement to competencies is a prerequisite for the success of digitalisation in the service development sector. The increasing use of information technology in health and social care needs to be taken into account in the education of the health and social care sector work force. The mandate of the national SotePeda 24/7 project is to identify and define the informatics competencies required for multidisciplinary education of this sector in Finland. The project has adapted international recommendations for use in the national context. The national recommendation covers 12 areas of competency and related content. In

addition to defining competencies, the project has produced a toolbox of materials for use by educators of these topics in universities that cover applied sciences and lifelong learning. The results of the project are expected to significantly improve the preparedness of graduating health and social care and related engineering and business sector students to make full use information technology, all of which benefits the national health and social welfare system.

General information
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MoE publication type: A4 Article in a conference publication
Organisations: BioMediTech, Tampere Uni. of Applied Sci., Laurea University of Applied Sciences, University of Eastern Finland
Contributors: Värri, A., Tiainen, M., Rajalahti, E., Kinnunen, U. M., Saarni, L., Ahonen, O.
Number of pages: 5
Pages: 1143-1147
Publication date: 16 Jun 2020

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Publisher: IOP Press
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Name: Studies in Health Technology and Informatics
Volume: 270
ISSN (Print): 0926-9630
ASJC Scopus subject areas: Biomedical Engineering, Health Informatics, Health Information Management
Keywords: competence, education, health care, informatics, information technology, skill, social care
Electronic versions:

SHTI-270-SHTI200341
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http://urn.fi/URN:NBN:fi:tuni-202007076340
Source: Scopus
Source ID: 85086905812
Research output: Chapter in Book/Report/Conference proceeding › Conference contribution › Scientific › peer-review

The Duke treadmill score in assessing the prognosis of patients tested with bicycle ergometer

Introduction: The Duke Treadmill Score (DTS) is a weighted index combining treadmill exercise time, maximum ST-segment deviation and exercise-induced angina (DTS = Exercise time – [5 x Max ST-deviation)] – [4 x Angina index]). DTS is one of the most widely studied and clinically used prognostic parameter in treadmill exercise testing, albeit the prognostic capability of DTS independently of its components has not been adequately studied. There are no previous studies on the prognostic value of DTS from standard bicycle ergometer. Purpose: The aim of this study was to assess the prognostic usefulness of DTS among patients undergoing standard bicycle ergometer testing in two different populations. Methods: A total of 3936 patients (2371 men) in the Finnish Cardiovascular Study (FINCAVAS) and 2683 men in the Kuopio Ischemic Heart Disease study (KIHD) underwent a standard bicycle ergometer test. DTS was formed with ST-segment deviation and angina pectoris data as appropriate and by converting metabolic equivalents of task (METs) to standard treadmill exercise time. Results: In FINCAVAS, during a median 6.3-year (interquartile range, IQR, 4.5–8.2) follow-up period, 180 patients (4.6%) suffered the primary endpoint, cardiovascular (CV) mortality. In KIHD, 562 patients (21.0%) died from CV causes during the median follow-up of 24.1 (IQR 18.0–26.2) years. Using Cox regression, DTS was predictive of CV death in both study populations as a continuous variable after adjustment with age, sex, body mass index, current smoking, history of coronary heart disease, diabetes and usage of β-blockers (FINCAVAS; HR 1.03, 95% CI 1.01–1.06, p=0.004 and KIHD; HR 1.04, 95% CI 1.03–1.06, p<0.001). As a three-category-variable, DTS was still predictive of CV death (FINCAVAS; adjusted HR 3.15 for lowest and highest tertile, 95% CI 1.83–5.42, p<0.000 and KIHD; adjusted HR 1.71, 95% CI 1.34–2.18, p<0.000). However, after adjusting for the individual components of DTS (METs, ST-segment deviation and exercise-induced angina), DTS was not associated with CV mortality in either study populations (FINCAVAS; adjusted HR 1.15, 95% CI 0.60–2.19, p=0.672 and KIHD; adjusted HR 0.90, 95% CI 0.68–1.20, p=0.466). Exercise capacity as METs was the only DTS component significantly predicting CV mortality in both study populations (p<0.001). Conclusions: The Duke Treadmill Score seemed to be predictive of CV death for patients who underwent bicycle exercise test in two different populations. However, when adjusted with its components, the predictive power of DTS disappeared, as METs proved to be a superior predictor. Future treadmill-based research should also elucidate the role of DTS independent of its components, particularly exercise capacity.

General information
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Organisations: Faculty of Biomedical Sciences and Engineering
Contributors: Viik, J.
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Research output: Other conference contribution › Paper, poster or abstract › Scientific

Cost effective potentiostat design for large dynamic range measurements

General information
Publication status: Published
MoE publication type: Not Eligible
Organisations: Faculty of Biomedical Sciences and Engineering, Research group: Nanoscale Phenomena and Measurements (NPM), Research group: Sensor Technology and Biomeasurements (STB)
Contributors: Virtanen, J., Tuukkanen, S.
Number of pages: 1
Publication date: 15 May 2015
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Event: Paper presented at Micronano System Workshop, Espoo, Finland.
ASJC Scopus subject areas: Engineering(all)
Keywords: potentiostat
Research output: Other conference contribution › Paper, poster or abstract › Scientific