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Neural Engineering and Neurophysiology
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Forskningsprofil

RESEARCH VISION AND MISSION

I believe in improving quality of life for people with impaired sensory or motor capabilities through development of innovative, implantable technological solutions that are inspired by human biology. I work towards bridging animal and human research to create unique knowledge and novel rehabilitation systems.

RESEARCH STRATEGY AND EXAMPLE RESEARCH PROJECTS

My research was initiated within animal work, and most of my work has been carried out in animal models – however since 2013, my work also taken a translational step towards clinical work. All my work is ultimately dedicated to the development of future clinical sensory and motor rehabilitation devices and therapies for use in human patients.

Example research projects: Animal model of ischemic stroke, Animal models of neuropathic and phantom limb pain, Direct sensory feedback to alleviate phantom limb pain, Invasive brain computer interfacing.

RESEARCH EXPERTISE

Specialist knowledge within the area of neural engineering, including new implantable technologies to assess, understand and modulate neuroplasticity for treatment of diseased or damaged neural system.

Experience with development and test of medical device equipment in collaboration with national and international companies.

Experience with development and test of medical equipment (invasive and non-invasive) at multi-national level (approvals obtained at the national ethical committee systems and national competent authorities for human tests, knowledge of performing animal and human tests to comply with the EU medical device directive).

Broad knowledge of national and international policies, strategies, mega-trends etc. within health.

Ansættelse

Professor, Leder

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Institut for Medicin og Sundhedsteknologi
Det Sundhedsvidenskabelige Fakultet
Gistrup, Danmark
1 jan. 2000 → 31 dec. 4712

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Aalborg East, Danmark
1 feb. 2015 → present

Publikationer

High-frequency electrical stimulation increases cortical excitability and mechanical sensitivity in a chronic large animal model
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Spared ulnar nerve injury results in increased layer III-VI excitability in the pig somatosensory cortex
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Referred Sensation Areas in Bilateral Upper Limb Amputee

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Meijs, S., Schmelz, M., Meilin, S. & Jensen, W., nov. 2021, I: Lab Animal. 50, s. 313-326

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Short-term Suppression of Somatosensory Evoked Potentials and Perceived Sensations in Healthy Subjects Following TENS

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Correlation between Anesthesia Level and Cortical Oscillations: The Problem with Anesthetized Animal Studies

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Transcutaneous Electrical Stimulation Influences the Time-Frequency Map of Cortical Activity - A Pilot Study

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Stability of flexible thin-film metallization stimulation electrodes: analysis of explants after first-in-human study and improvement of *in vivo* performance

Čvančara, P., Boretius, T., López-Álvarez, V. M., Maciejasz, P., Andreu, D., Raspopovic, S., Petrini, F. M., Micera, S., Granata, G., Fernandez, E., Rossini, P. M., Yoshida, K., Jensen, W., Divoux, J.-L., Guiraud, D., Navarro, X. & Stieglitz, T., 8 jul. 2020, I: *Journal of Neural Engineering*. 17, 4, 1 s., 046006.

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The Short-Term Repeatability of Subdermal Electrical Stimulation for Sensory Feedback

Dong, J., Kamavuako, E. N., Dosen, S., Jensen, W. & Geng, B., 1 jan. 2020, I: *IEEE Access*. 8, s. 63983-63992 10 s., 9051664.

The Variability of Psychophysical Parameters following Surface and Subdermal Stimulation: A Multiday Study in Amputees

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Nerve Injury Decreases Hyperacute Resting-State Connectivity Between the Anterior Cingulate and Primary Somatosensory Cortex in Anesthetized Rats

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A New Treatment for Phantom Limb Pain Based on Restoration of Somatosensory Feedback Through Intraneuronal Electrical Stimulation

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Biocompatibility of the TIME Implantable Nerve Electrode

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A novel high channel-count system for acute multisite neuronal recordings

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Electroneurography

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Electrophysiological response dynamics during focal cortical infarction

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On variability and use of rat primary motor cortex responses in behavioral task discrimination

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Chiganos, T. C., Jensen, W. & Rousche, P. J., 2005, *Proceedings of the 2005 BMES Annual Fall Meeting, Biomedical Engineering Society, 28 September-1 October 2005, Baltimore, MD, USA*.

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Encoding of self-paced, repetitive forelimb movements in rat primary motor cortex

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Long-term recording properties of longitudinal intra-fascicular electrodes

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Angular resolution and working ranges of flexion-extension information in nerve cuff recordings of muscle afferent activity

Jensen, W., Riso, R. R., Sepulveda, F. & Sinkjær, T., 2001, *Proceedings of the 6th Annual Conference of the International Functional Electrical Stimulation Society, IFESS 2001, 17-20 June 2001, Cleveland, OH, USA*.

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Effect of initial joint position on nerve cuff recordings of muscle afferents in rabbits

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First insights on muscle afferent nerve signals for closed-loop control of FES-generated rabbit ankle movements

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Measurement of intrafascicular insertion force of a tungsten needle into peripheral nerve

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Muscle afferent signals for FES systems

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Neuro-fuzzy extraction of angular information from muscle afferents for ankle control during standing in paraplegic subjects: an animal model

Micera, S., Jensen, W., Sepulveda, F., Riso, R. R. & Sinkjær, T., 2001, I: IEEE Transactions on Biomedical Engineering. 48, 7, s. 787-794

The rabbit model and LIFE as a neural interface

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Using nerve signals from muscle afferent electrodes to control FES-based ankle motion in a rabbit

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Effect of intertrial delay on whole nerve cuff recordings of muscle afferents in rabbits

Jensen, W., Riso, R. R. & Sinkjær, T., 2000, I: Neuromodulation: Technology at the Neural Interface. 3, 1, s. 43-53

Nerve cuff recordings of muscle afferent activity from tibial and peroneal nerves in rabbit during passive ankle motion

Riso, R. R., Mosallaie, F. K., Jensen, W. & Sinkjær, T., 2000, I: IEEE transactions on rehabilitation engineering. 8, 2, s. 244-258

On-line joint angle estimation based on nerve cuff recordings from muscle afferents

Jensen, W., Riso, R. R. & Sepulveda, F., 2000, IFESS 2000. NP 2000, Proceedings, 5th Annual Conference of the International Functional Electrical Stimulation Society, 6th Triennial Conference "Neural Prostheses: Motor Systems", 18-24 June 2000, Aalborg, Denmark. Sinkjær, T., Popovic, D. & Struijk, J. J. (red.). Center for Sensory-Motor Interaction (SMI), Department of Health Science and Technology, Aalborg University. s. 376-377

A fuzzy model for extraction of angular position information from whole nerve cuff muscle afferent recordings: preliminary results

Micera, S., Jensen, W., Sepulveda, F., Riso, R. R. & Sinkjær, T., 1999, IFESS 1999, Proceedings of the 4th Annual Conference of the International Functional Electrical Stimulation Society, 23-27 August 1999, Sendai, Japan. s. 299-302

Nerve cuff recordings of muscle afferents during electrical stimulation of agonist-antagonist muscle pain

Jensen, W., Riso, R. R. & Sinkjær, T., 1999, IFESS 1999, Proceedings of the 4th Annual Conference of the International Functional Electrical Stimulation Society, 23-27 August 1999, Sendai, Japan. s. 303-306

Effect of initial position on nerve cuff recordings of muscle afferents during passive rotation of the ankle joint in rabbit

Jensen, W., Riso, R. R. & Sinkjær, T., 1998, Abstract Book, 4th International Congress, INS/IFESS, 16-20 September 1998, Lucerne, Switzerland. s. 252, No. PP19

Position information in whole nerve cuff recordings of muscle afferents in a rabbit model of normal and paraplegic standing

Jensen, W., Riso, R. R. & Sinkjær, T., 1998, Proceedings of the 20th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Vol. 20, No. 5, 29 October-1 November 1998, Hong Kong. s. 2528-2531

Causal probabilistic network and power spectral estimation used in sleep stage classification

Nielsen, K. D., Kjær, A., Jensen, W., Dyrby, T., Andreasen, L. N. S., Andersen, J. & Andreassen, S., 1997, I: Methods of Information in Medicine. 36, s. 345-348

Nerve cuff recordings of muscle afferent activity during passive joint motion in a rabbit

Sinkjær, T., Riso, R. R., Mosallaie, F., Jensen, W. & Lawrence, S., 1997, IFESS 97, Proceedings of the 2nd Annual Conference, International Functional Electrical Stimulation Society and the 5th Triennial Conference: Neural Prostheses Motor Systems (NP 97), 16-21 August 1997, Burnaby, Canada. s. 219-220

Causal probabilistic network and power spectral estimation used for sleep classification

Nielsen, K. D., Andersen, J. M., Andreassen, L. N. S., Dyrby, T., Jensen, W., Kjær, A. G. & Andreassen, S., 1996, *Proceedings of the 2nd IFMBE-IMIA International Workshop on Biosignal Interpretation, International Federation for Medical and Biomedical Engineering (IFMBE)*, 1996. s. 211-214

Identification of the relationship between center of pressure and ankle angle during standing of normal subjects

Jensen, W., Struijk, L. N. S. A., Veltink, P. H. & Mayagoitia, R., 1996, *Proceedings of the 18th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 31 October-3 November 1996, Amsterdam, the Netherlands*. Bind 2. s. 575-576

Natural sensory feedback for control of standing

Struijk, L. N. S. A., Jensen, W., Veltink, P. H. & Struijk, J. J., 1996, *Proceedings of the 18th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 31 October-3 November 1996, Amsterdam, the Netherlands*. Bind 1. s. 441-442

Aktiviteter**Backward translation of human pain models - CNAP 10yr anniversary**

Jensen, W. (Foredragsholder)

6 maj 2025

Facilitatoruddannelsen (Playmakers.dk)

Jensen, W. (Andet)

2024

AAU Interdisciplinary Leadership Course

Jensen, W. (Andet)

2023

Udvalget til konstruktion af forskningsindikator på AAU (Begivenhed)

Stoustrup, J. (Forperson), Jensen, W. (Medlem), Kristensen, T. N. (Medlem), Larsen, B. (Medlem), Albretsen, J. (Medlem), Müller, C. (Medlem), Nielsen, T. (Medlem), Bjerg Bennike, K. (Medlem), Melchiorsen, P. M. (Medlem) & Sivertsen, G. (Medlem)
sep. 2022 → feb. 2023

Aalborg Universitet - proceskonsulentuddannelsen (Mannaz.dk)

Jensen, W. (Andet)

2020

Studielederkursus (SyddanskUniversitet.dk)

Jensen, W. (Andet)

2014

Opponent on Ph.D-defense (Ekstern organisation)

Jensen, W. (Medlem)

30 mar. 2012

Forskeren som leder - ledelse af forskere på AAU

Jensen, W. (Andet)

2012

UIC animal Care Committee Training (University of Illinois at Chicago)

Jensen, W. (Andet)

2003

Univesitetspædagogik for adjunkter (Aalborg Universitet)
Jensen, W. (Andet)
2001 → 2003

Dyreforsøgskundskab
Jensen, W. (Andet)
1997

Priser

3rd Best Paper Award

Rettore Andreis, F. (Modtager), Jensen, W. (Modtager), Janjua, T. (Modtager), Meijs, S. (Modtager) & Nielsen, T. G. N. D. S. (Modtager), okt. 2023

Ridder af Dannebrogordenen
Jensen, W. (Modtager), 9. okt. 2024

Vanførefondens forskningspris
Jensen, W. (Modtager), 2016

Presse/medie

10 teknologiske tendenser, du bør kende: #4. Trådløse signaler mellem hjerne og muskel erstatter ødelagt rygmarv
Jensen, W.
03/05/2017
1 element af Mediedækning

Banebrydende metode kan hjælpe amputerede
Jensen, W. & Sørensen, P.
23/02/2016
1 element af Mediedækning

Behandling af fantomsmerter hos amputerede
Lontis, R. & Jensen, W.
20/02/2024
1 element af Mediedækning

Bionisk protese
Jensen, W.
26/02/2015
1 element af Mediedækning

Commentary: Geometric Characterisation of Local Changes in Tungsten Microneedle Tips after In-Vivo Insertion into Peripheral Nerves
Jensen, W.
06/09/2022
1 element af Mediedækning

Danske forsøgspersoner skal have elektroder opereret ind i nerverne
Jensen, W.
25/03/2014
6 elementer af Mediedækning

Dansker med fingerprotese føler teksturer for første gang i verden

Jensen, W.

09/03/2016

1 element af Mediedækning

Det hele kommer fra hjernen af

Jensen, W.

30/11/2013

1 element af Mediedækning

Elektroniske nerver

Jensen, W.

12/12/2008

1 element af Mediedækning

En robotarm og to bioniske øjne, tak!

Jensen, W.

18/10/2015

1 element af Mediedækning

En robotarm og to bioniske øjne, tak!

Jensen, W.

19/10/2015

2 elementer af Mediedækning

En underlig "krablen-krablen"

Jensen, W.

01/11/2008

1 element af Mediedækning

Forskere vil manipulere med fantomsmærter

Jensen, W.

22/02/2008

1 element af Mediedækning

Forskere vil snyde kroppens fantomsmærter

Jensen, W.

13/12/2013

50 elementer af Mediedækning

Forsknings i fantomsmærter

Jensen, W.

22/02/2008

1 element af Mediedækning

Forsknings i fantomsmærter

Jensen, W.

22/02/2008

2 elementer af Mediedækning

Forsknings i neuroteknologi giver store muligheder

Struijk, J., Rijkhoff, N., Jensen, W. & Sinkjær, T.

12/12/2008

1 element af Mediedækning

Forsøgssdyr i forskningens tjeneste

Jensen, W.

01/12/2007

1 element af Mediedækning

Fremitidens menneske kan trække på to typer reservedele

Jensen, W.

10/04/2015

2 elementer af Mediedækning

Grise hjælper forskere med at bekæmpe fantomsmerter

Jensen, W.

17/03/2016

2 elementer af Mediedækning

Hjerne-Madsen underholder fuld AAU-sal

Hüttel, H., Hansen, K. T. & Jensen, W.

04/11/2014

2 elementer af Mediedækning

Implantat i hjernen viser vej til helbredelse

Jensen, W.

16/06/2011

1 element af Mediedækning

Jagten på supermennesket

Jensen, W. & Birkholm, K.

06/02/2015

4 elementer af Mediedækning

Lam teenager i robotdragt skal sparke VM i gang

Jensen, W.

12/06/2014

1 element af Mediedækning

Medicinske muligheder

Jensen, W.

25/08/2015

1 element af Mediedækning

Moderne mirakler

Struijk, L. N. S. A., Bentsen, B., Jensen, W. & Lontis, E. R.

27/03/2017

1 Mediebidrag

Navnenyt

Graven-Nielsen, T., Arendt-Nielsen, L., Andersen, O. K. & Jensen, W.

21/10/2014

1 element af Mediedækning

Nye medlemmer af ATV

Jensen, W. & Kanstrup, A. M.

07/05/2014

5 elementer af Mediedækning

Nye medlemmer af ATV
Kanstrup, A. M. & Jensen, W.
28/05/2014
1 element af Mediedækning

Nyt forskningsprojekt skal komme fantomsmærter til livs
Jensen, W.
13/12/2013
1 element af Mediedækning

Nyt forskningsprojekt skal komme fantomsmærter til livs
Jensen, W.
25/03/2014
1 element af Mediedækning

Ny viden om nerverne kan genskabe organer og sanser
Rijkhoff, N., Struijk, J., Jensen, W. & Sinkjær, T.
13/12/2008
2 elementer af Mediedækning

Når de lamme skal gå
Jensen, W.
24/06/2014
1 element af Mediedækning

Professorer modtager ridderkorset
Duedahl, P., Jensen, W. & Kørnøv, L.
20/11/2024 → 21/11/2024
2 elementer af Mediedækning

Robotteknologi: Dansker føler med kunstig hånd
Jensen, W.
05/02/2014
13 elementer af Mediedækning

Rotter skal løse blodprop-gåde
Jensen, W.
16/06/2011
2 elementer af Mediedækning

Spørg Scientariet: Hvor meget elektricitet kan menneskekroppen holde til?
Jensen, W.
06/05/2017
1 element af Mediedækning

Stor bevilling skal mindske antallet af invalide efter slagtifælde
Andersen, O. K. & Jensen, W.
24/06/2014
10 elementer af Mediedækning

Sundhedsteknologi: Så tæt er vi på at være cyborgs
Jensen, W.
16/10/2012
2 elementer af Mediedækning

Superkroppe og fantomsmerter

Jensen, W.

03/02/2025

1 element af Mediedækning

Superkroppe og fantomsmerter

Jensen, W.

14/07/2025

1 element af Mediedækning

Supermennesker

Jensen, W.

24/10/2014

1 element af Mediedækning

Tre professorer fra AAU modtager ridderkors

Duedahl, P., Jensen, W. & Kørnøv, L.

13/12/2024

1 element af Mediedækning

Vanførefondens Forskerpris til AAU forsker

Jensen, W.

15/06/2016

3 elementer af Mediedækning

Vanførefondens Forskerpris til AAU-professor

Jensen, W.

24/05/2016

12 elementer af Mediedækning

Winnie Jensen

Jensen, W.

05/10/2011

2 elementer af Mediedækning

Winnie Jensen - returned associate professor at Aalborg University

Jensen, W.

05/02/2009

1 element af Mediedækning

Aalborg-forskere fjerner fantomsmerter med strøm

Jensen, W.

14/11/2016

2 elementer af Mediedækning

Aalborg Universitet vil behandle fantomsmerter

Jensen, W.

01/02/2016

2 elementer af Mediedækning

Projekter**Advancing Peripheral Nerve Interfaces in a Large Animal Model**

Rettore Andreis, F. (PI (principal investigator)), Jensen, W. (Projektleder) & Nielsen, T. G. N. D. S. (Supervisor)

01/04/2019 → 01/07/2022

Bevica Center for NeuroEngineering Solutions in Stroke Rehabilitation

Andersen, O. K. (PI (principal investigator)), Jensen, W. (PI (principal investigator)), Jørgensen, H. R. M. (Projektdeltager), Moeslund, T. B. (Projektdeltager), Mrachacz-Kersting, N. (Projektdeltager), Nielsen, J. F. (Projektdeltager), Petrini, L. (Projektdeltager), Spaich, E. G. (Projektdeltager), Modrau, B. (Projektdeltager), Svaneborg, N. (Projektdeltager), Larsen, B. (Projektdeltager) & Knudsen, G. H. (Projektdeltager)
01/09/2014 → 31/08/2019

EPIONE: EPIONE- Natural sensory feedback for phantom limb modulation and therapy

Jensen, W. (PI (principal investigator)), Nielsen, T. G. N. D. S. (Projektdeltager), Lontis, E. R. (Projektdeltager), Geng, B. (Projektdeltager) & Harreby, K. R. (PI (principal investigator))
01/07/2013 → 01/07/2017

Konstruktion af forskningsindikator til AAU

Stoustrup, J. (PI (principal investigator)), Jensen, W. (Col (co-investigator)), Kristensen, T. N. (Col (co-investigator)), Larsen, B. (Col (co-investigator)), Müller, C. (Col (co-investigator)), Nielsen, T. (Col (co-investigator)), Albretsen, J. (Col (co-investigator)), Bjerg Bennike, K. (Col (co-investigator)), Melchiorsen, P. M. (Col (co-investigator)) & Sivertsen, G. (Col (co-investigator))
Aalborg University
14/09/2022 → 31/12/2023

Neural Mechanisms in Ischemic Stroke

Jensen, W. (PI (principal investigator)), Nielsen, T. G. N. D. S. (Projektdeltager) & Nielsen, R. K. (Projektdeltager)
01/04/2005 → ...

Phantom Limb Pain - Neural Mechanisms And Innovative Treatments

Jensen, W. (PI (principal investigator)), Lontis, E. R. (Col (co-investigator)), Jadidi, A. F. (Projektdeltager) & Zarei, A. A. (Projektansøger)
01/09/2015 → 01/09/2025

Translational Animal Models of Pain

Jensen, W. (PI (principal investigator)), Meijs, S. (Projektdeltager), Rettore Andreis, F. (Projektdeltager), Atchuthan, N. A. (Projektdeltager), Nielsen, T. G. N. D. S. (Projektdeltager), Janjua, T. (Projektdeltager), Tøttrup, L. (Projektdeltager) & Nielsen, R. K. (Projektdeltager)
01/09/2015 → 01/09/2025

TIME: Transverse, Intrafasicular Multichannel Electrode system for Induction of sensation and treatment of phantom limb pain in amputees

Jensen, W. (Projektdeltager), Geng, B. (PI (principal investigator)), Kundu, A. (Projektdeltager), Harreby, K. R. (Projektdeltager) & Lontis, E. R. (Projektansøger)
01/05/2008 → 30/04/2012

TEST

TEXT SECTION can be added.