# Christian Froekjaer Jensen, PhD

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## EDUCATION

**University of Copenhagen, School of Medicine** July 2008
Ph.D., Biomedical Science
Thesis: $K^+$ *channel localization and function – A Genetic and Electrophysiological Study*

**University of Oregon** October 2004
M.S., Neuroscience

**University of Copenhagen, Niels Bohr Institute** September 2002
M.S., Biophysics

**University of Copenhagen** August 2000
B.S., Physics and Biophysics

## RESEARCH EXPERIENCE

**Visiting Scientist, University of Stanford** 2014 - present
Departments of Pathology and Genetics
Advisor: Andrew Z. Fire

- Showed that non-coding DNA "watermarks" in genes can prevent epigenetic silencing in *C. elegans*

This work resulted in a first-author publication in *Cell* and a manuscript in preparation.

**Postdoctoral Researcher, HHMI, University of Utah** 2008 - 2014
Department of Biology
Advisor: Erik M. Jorgensen

- Developed methods and reagents to engineer the *C. elegans* genome with transposons

This work resulted in 4 first-author publications in *Nature Genetics* and *Nature Methods*. Two additional manuscripts are in review. This research was funded by postdoctoral fellowships from the Lundbeck and Carlsberg Foundations and an NIH grant I co-wrote.

**Graduate Student, University of Copenhagen** 2004 - 2008
School of Medicine
Advisor: Søren-Peter Olesen

- Demonstrated that $K^+$ channel localization at the axon intitial segment of hippocampal neurons depends on the scaffold protein Ankyrin

This work resulted in a publication in *Journal of Cell Science* and the research was funded by a predoctoral fellowship from "Fonden af 17.12.1981".

**Graduate Student, University of Oregon** 2002 - 2004

Institute of Neuroscience
Advisor: Shawn Lockery

- Showed that microRNA regulation of left/right nervous system assymetry resulted in behavioral deficits in chemosensation.

This work resulted in publications in *Nature*, *Genetics*, and *PlosOne*. The research was funded by a predoctoral fellowship from the American Heart Association. Please note, for personal reasons, I transferred to the PhD program at University of Copenhagen after successfully completing the proposal exam and teaching obligations.

**Masters Student, University of California, San Diego (visiting student)** 2000 - 2002

Department of Biology
Advisor: William Schafer (now at the Medical Research Council, Cambridge)

- Demonstrated that auxillary subunits of voltage-gated calcium channels are necessary for mechanosensation and neuron development with genetically encoded sensors

This work resulted in publications in *Nature Neuroscience*, *Neuron*, and *Journal of Neurobiology*. The research was funded by a summer fellowship from HHMI and a travel fellowship from the Psychiatric Research Foundation.

## RESEARCH GRANTS

NIH Grant Writing

2011-2015 Engineering the *C. elegans* genome (R01GM095817)
Principal Investigator: Erik M. Jorgensen, University of Utah
Impact Score: 10. Funded, four years, $1,007,295
*Role: primary author on the grant. My work on developing methods to generate targeted transgene insertions and endogenous gene deletions was the basis for this grant. I developed the three aims, provided the preliminary data, and wrote the grant with input from Dr. Jorgensen. The grant was recently renewed by Dr. Jorgensen.*

2011-2015 Gene expression and transposon defense in the *C. elegans* germline (1K99 GM106048-01)
Principal Investigator: Christian Froekjaer Jensen, University of Utah
Impact Score: 19. Not funded.
*Role: primary author on the grant. Although the grant was ultimately not funded, the project resulted in a fruitful collaboration with Dr. Fire's laboratory.*

## FELLOWSHIPS

Postdoctoral Research

2011-2013 Carslberg Foundation Postdoctoral Fellowship
$105,002

2008-2011 Lundbeck Foundation Fellowship
$253,019

Predoctoral Research

2004-2007 Fonden af 17.12.1981 Predoctoral Fellowship
3 years full salary and stipend.

2003-2004 American Heart Association Predoctoral Fellowship
2 years full salary and stipend.

## HONORS & AWARDS

2009 Young Investigator of the Year, Medical School, University of Copenhagen
2007 Best oral presentation, Neuroscience Day, University of Copenhagen
2003 Society for Neuroscience, Oregon Chapter, Soma Award

## PUBLICATIONS

**Genome organization & Epigenetics**

1. **Frøkjær-Jensen C**, Jain N, Hansen L, Davis MW, Li Y, Zhao D, Rebora K, Millet JRM, Liu X, Kim SK, Dupuy D, Jorgensen EM, Fire AZ. An abundant class of non-coding DNA can prevent stochastic gene silencing in the *C. elegans* germline, *Cell,* 166:343–357, **2016**.

Faculty of a 1000, "Very good", 1 review

2. Wheeler BS, Anderson E, **Frøkjær-Jensen C**, Bian Q, Jorgensen EM, Meyer BJ. Chromosome-wide mechanisms to decouple gene expression from gene dose during sex-chromosome evolution. In press, *eLife*.

**Genetic Engineering Techniques**

3. **Frøkjær-Jensen C**, M Wayne Davis, Mihail Sarov, Jon Taylor, Stephane Flibotte, Matthew LaBella, Andrei Pozniakovski, Donald G Moerman, Erik M Jorgensen. Random and targeted integration of transgenes in *C. elegans* using a modified Mos1 transposon, *Nature Methods,* 11:529-34, **2014**.

4. **Frøkjær-Jensen C**, M Wayne Davis, Ailion M and Jorgensen EM. Improved Mos1-mediated transgenesis in *C. elegans, Nature Methods,* 9:117-8, **2012**.

5. Zeiser E, **Frøkjær-Jensen C**, Jorgensen E, Ahringer J. MosSCI and gateway compatible plasmid toolkit for constitutive and inducible expression of transgenes in the *C. elegans* germline, *PLoS One,* 6:e20082, **2011**.

6. **Frøkjær-Jensen C**, Davis MW, Hollopeter G, Taylor J, Harris TW, Nix P, Lofgren R, Prestgard-Duke M, Bastiani M, Moerman DG, Jorgensen EM. Targeted gene deletions in *C. elegans* using transposon excision, *Nature Methods,* 7:451-3, **2010**.

7. **Frøkjær-Jensen C**, Davis MW, Hopkins CE, Newman BJ, Thummel JM, Olesen SP, Grunnet M, Jorgensen EM. Single-copy insertion of transgenes in *Caenorhabditis elegans*. *Nature Genetics*. 40:1375-83, **2008**.

Nature Methods "Research Highlight" (5: p995)
Faculty of a 1000, "Must Read Article", 4 reviews.

**Neuroscience**

8. Lainé V[*], **Frøkjær-Jensen C**[*], Couchoux H and Jospin M. The a1 subunit EGL-19, the alpha2/delta subunit UNC-36 and the beta subunit CCB-1 underlie voltage-dependent calcium currents in *C. elegans* striated muscle, *Journal of Chemical Biology,* 286:36180-7, **2011**.

([*]Equal contribution)

9. **Frøkjær-Jensen C**, Ailion M, Lockery SR. Ammonium-acetate is sensed by gustatory and olfactory neurons in *Caenorhabditis elegans, PLoS One,* 3:e2467, **2008**.

10. Rasmussen HB, **Frøkjær-Jensen C**, Jensen CS, Jensen HS, Jørgensen NK, Misonou H, Trimmer JS, Olesen SP, Schmitt N. Requirement of subunit co-assembly and ankyrin-G for M-channel localization at the axon initial segment, *Journal of Cell Science,* 120:953-63, **2007**.
11. **Frøkjær-Jensen C**, Kindt KS, Kerr RA, Suzuki H, Melnik-Martinez K, Gerstbreih B, Driscol M, Schafer WR. Effects of voltage-gated calcium channel subunit genes on calcium influx in cultured *C. elegans* mechanosensory neurons, *Journal of Neurobiology,* 66:1125-39, **2006**.
12. Ortiz CO, Etchberger JF, Posy SL, **Frøkjær-Jensen C**, Lockery S, Honig B, Hobert O. Searching for neuronal left/right asymmetry: genomewide analysis of nematode receptor-type guanylyl cyclases, *Genetics,* 173:131-49, **2006**.
13. Bianchi L, Gerstbrein B, **Frøkjær-Jensen C**, Royal DC, Mukherjee G, Royal MA, Xue J, Schafer WR, Driscoll M. The neurotoxic MEC-4(d) DEG/ENaC sodium channel conducts calcium: implications for necrosis initiation, *Nature Neuroscience,* 7:1337-44, **2004**.
14. Chang S, Johnston RJ Jr, **Frøkjær-Jensen C**, Lockery S, Hobert O. MicroRNAs act sequentially and asymmetrically to control chemosensory laterality in the nematode. *Nature,* 430:785-9, **2004**.
15. Suzuki H, Kerr R, Bianchi L, **Frøkjær-Jensen C**, Slone D, Xue J, Gerstbrein B, Driscoll M, Schafer WR. In vivo imaging of *C. elegans* mechanosensory neurons demonstrates a specific role for the MEC-4 channel in the process of gentle touch sensation, *Neuron,* 39:1005-17, **2003**.
16. Grunnet M, Jespersen T, Angelo K, **Frøkjær-Jensen C**, Klaerke DA, Olesen SP, Jensen BS. Pharmacological modulation of SK3 channels, *Neuropharmacology,* 40:879-87, **2001**.

### REVIEWS

1. **Frøkjær-Jensen C**. Exciting prospects for precise engineering of *Caenorhabditis elegans* genomes with CRISPR/Cas9, *Genetics,* 195:635-42, **2013**.

### PREVIEWS

1. **Frøkjær-Jensen C**, Jorgensen EM. Calcium: an insignificant thing. *Nature Neuroscience*, 12:1213-4, **2009**.

### BOOK CHAPTERS

1. **Frøkjær-Jensen C**. Transposon Assisted Genetic Engineering with Mos1 mediated single-copy insertion (MosSCI), pp.49-58. Book: C. elegans, Methods and Applications", Humana Press , eds. Gal Haspel & David Biron, **2015**.

## PRESENTATIONS

Invited Oral Presentations

2015 "A class of non-coding DNA can prevent epigenetic silencing in the *C. elegans* germline", Centre for Genomic Regulation, Barcelona

2011 "*C. elegans* genome engineering techniques", Keynote, Nordic *Caenorhabditis elegans* network meeting

Conference Oral Presentations

2014 "CRISPR and Mos1 technology", European Worm Meeting, Berlin

2013 "Periodic A/T rich DNA structures promote germline expression", 19th International *C. elegans* meeting, Los Angeles, CA

2011 "A recombinant Mos1 transposon can carry large DNA fragments", Plenary, 18th International *C. elegans* meeting, Los Angeles, CA

2009 "Using Mos1 elements to modify the genome", 17th International *C. elegans* meeting, Los Angeles, CA

2008 "Single copy insertion of transgenes in C. elegans", Plenary, Neuronal Development and Synaptic function, Madison, WI

2007 "Single copy transgene insertion", 16th International *C. elegans* meeting, Los Angeles, CA

## SCIENTIFIC COMMUNITY SERVICE

**Ad Hoc Reviewer** 2011 - present

*Nature Methods*, *Genetics*, *Scientific Reports*, *Nature Communications*, *Journal of Visual Experiments (JOVE),* and *Plos One*

**Reagents and Resources** 2009 - present

Development and maintenance of www.wormbuilder.org with protocols, strains, and reagents for *C. elegans* genome engineering. > 3000 plasmids distributed via Addgene and several of the top10 strains distributed annually from the CGC strain repository.

## TEACHING EXPERIENCE

**Summer Course, Introduction to *C. elegans*, CRG, Barcelona** 2015

Lecturer at inaugural summer course on *C. elegans*.

**Teaching Assistant, University of Oregon** 2002-2004

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| Bio 132 | Introduction to Animal Behavior |
| Bio 360 | Neurobiology |
| Bio 133 | Sensation, Behavior, and Biology |

## MENTORING & SUPERVISION

**Technicians** 2012 - 2014

Kam Hoe. Sole supervision and training of Kam in molecular biology techniques
*Current: Technician in Dr. Jorgensen's laboratory*

**Graduate students** 2013

Julius Fredens. Interim advisor during 6 month visit from U. of Southern Denmark.
*Current: Postdoctoral Fellow, MRC, Cambridge, UK*

**Undergraduate students**

Tyler Shimko 2011- 2012
*Current: Graduate student, Stanford University*

Jason Thummel 2008
*Current: Mobile Gameplay Engineer, Electronic Arts*

Blake Newman 2006-2007
*Current: M.D., Fellow in Neurophysiology, University of Utah*