
Curriculum Vitae for Ulrik R. Beierholm

Post-doctoral researcher at the Gatsby Computational Neuroscience Unit, UCL

Contact Address:

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Education and Training:

PostDoc, Gatsby Computational Neuroscience Unit, UCL w Peter Dayan	2008 - Present
PostDoc, California Institute of Technology w Peter Bossaerts	2007 - 2008
PhD, California Institute of Technology CNS (Computation and Neural Systems) Thesis: Bayesian Modeling of Sensory Cue Combinations Advisor: Steven Quartz	May 2007
MS (Cand. Scient.), University of Copenhagen Physics Thesis: Reliability of Neural Encoding Advisor: Preben Alstrom	Feb 2001
BS, University of Copenhagen Physics, extended minor in Philosophy	Jan 1999

Awards:

Marie Curie Reintegration Fellowship (€80,000 over 3 years)	Jul 2008
Sloan-Swartz Fellowship in Theoretical Neuroscience (2 x \$15,000 USD)	2001, 2002
Grant from Knud Hojgaard Fund (\$2,000 USD)	Jul 2001
Fulbright fellowship from the Danish-American Fulbright (\$15,000 USD)	Jul 2001

Publications:

Guitart Masip*, **Beierholm***, Dolan, Duzel & Dayan
“Vigor in the face of fluctuating rates of reward”
In preparation.

Wozny, **Beierholm** & Shams
“Probability matching as a computational strategy used in low-level perception”
In preparation.

Shams & **Beierholm**
“Causal Inference in Perception”
Review paper in preparation for *Trends in Cognitive Sciences*.

Beierholm & Dayan
“Pavlovian-Instrumental interactions in Observing Behavior”
Under review at *Neuron*.

Wunderlich, **Beierholm**, Bossaerts & O’Doherty
“The human prefrontal cortex mediates optimal integration during inference about multiple causes”
Under review at *Science*.

Beierholm, Anen, Quartz & Bossaerts
“Simultaneous encoding of reflex-based and reflection-based learned values in the human brain”
Under review at *Neuron*.

Shams & **Beierholm**
“Causal Inference in Perception”
Book chapter to appear in *Sensory Cue Integration*, Oxford Press.

Beierholm, Quartz & Shams
“Priors and likelihoods are encoded independently in a multisensory perceptual task”
Journal of Vision, 9: 23, 1-11 (2009).

Wozny, **Beierholm** & Shams
“Human tri-modal perception follows optimal statistical inference”
Journal of Vision, 8: 24, 1-11 (2008).

Beierholm, Shams, Koerding & Shams
“Comparing Bayesian models for multisensory cue combination without mandatory integration”
Advances in Neural Information Processing Systems, 20: 81-88 (2008).

Koerding*, **Beierholm***, Ma*, Quartz, Tenenbaum & Shams
“Causal inference in multisensory perception”
PLoS One 9, e943 (2007).

Beierholm, Brings Jacobsen, Alstrom & Holstein-Rathlou

“Characteristics of blood vessels forming ‘Sausages-on-a-String’ patterns during hypertension”
Physica A, 376: 387–393 (2007).

Shams, Ma & **Beierholm**

“Sound-induced flash illusion as an optimal percept”
Neuroreport, 16: 1923-1927 (2005).

Brings Jacobsen, **Beierholm**, Mikkelsen, Gustaffsson, Alstrom & Holstein-Rathlou

"Sausage string appearance of arteries and arterioles can be caused by an instability of the blood vessel wall"
Am J Physiol - Regul Integr Comp Physiol, 283: R1181-R1130 (2002).

Alstrom, **Beierholm**, Nielsen, Ryge & Kiehn

"Reliability of neural encoding"
Physica A, 314: 61-68 (2002).

Beierholm, Nielsen, Ryge, Alstrom & Kiehn

"Characterization of reliability of spike timing in spinal interneurons during rhythmic inputs"
Journal of Neurophysiology, 86: 1858 (2001).

*Contributed equally

Teaching Experience:

Teaching Assistant

2003 - 2005

Courses: CNS 186 – **Vision: From Computational Theory to Neuronal Mechanisms**

CNS 187 – **Neural Computation**

Designing homework sets, grading and providing assistance to students.

Private Tutor

1999 - 2001

Providing tutoring to high school students in physics and mathematics.

Professional Meetings:

- Beierholm, Wunderlich, Bossaerts & O'Doherty Jun 2009
 "Neural correlates of hierarchical Bayesian inference during higher-order decision making in human prefrontal cortex"
 Poster presented at MSRL (*Multidisciplinary Symposium on Reinforcement Learning*), Montreal, Canada.
- Beierholm, Quartz, Shams Mar 2009
 "Brain's strategy for perceptual estimates: model averaging, model selection, or prob. matching?"
 Poster presented at COSYNE (*Cognitive and Systems Neuroscience*), Salt Lake City, Utah.
- Beierholm, Anen, Quartz, Bossaerts Mar 2009
 "Simultaneous encoding of reflex-based and reflection-based learned values in the human brain"
 Poster presented at COSYNE (*Cognitive and Systems Neuroscience*), Salt Lake City, Utah.
- Beierholm & Shams Oct 2008
 "Causal inference in perception: model selection or averaging?"
 Talk presented at *Computational Workshop on Cue Combination*, Giesen, Germany.
- Bossaerts, Beierholm, Anen, Tzieropoulos, Quartz, Grave de Peralta & Gonzalez Sep 2008
 "Neurobiological foundations for 'dual system' theory in decision making under uncertainty"
 Talk presented at *Society for Neuroeconomics*, Park City, Utah.
- Beierholm, Shams, Koerding & Shams Nov 2007
 "Comparing Bayesian models for multisensory cue combination without mandatory integration"
 Featured poster at *Neural Information Processing Systems*, Vancouver, Canada.
- Beierholm, Ma, Quartz, Shams Oct 2006
 "A hierarchical Bayesian ideal observer accounts for entire range of auditory-visual integration-segregation in humans"
 Talk presented at *Society for Neuroscience*, Atlanta, Georgia.
- Beierholm, Quartz, Shams Mar 2006
 "Do within modality and cross-modality sensory integration follow the same rules?"
 Featured poster presented at COSYNE (*Cognitive and Systems Neuroscience*), Salt Lake City, Utah.
- Beierholm, Quartz, Shams Nov 2005
 "Bayesian inference as a unifying model of auditory-visual integration and segregation"
 Poster presentation at *Society for Neuroscience*, Washington DC.
- Beierholm, Quartz, Shams Jun 2005
 "The ventriloquist illusion is Bayes-optimal"
 Poster presentation at IMRF (*International Multisensory Research Forum*), Rovereto, Italy.
- Beierholm, Quartz, Ma, Shams May 2005
 "The ventriloquist illusion as an optimal percept"
 Talk at *Vision Sciences Society Annual Meeting*, Sarasota, Florida.

Special Courses / Workshops:

- Okinawa Computational Neuroscience Course** Nov 2004
“Bayesian Brain: Probabilistic Approaches to Neural Coding and Learning”
Winter school in Okinawa, Japan.
- Nonlinear Dynamics in Biology** May 2000
Special course at Denmark’s Technical University, Denmark.
- Linear and Nonlinear Analysis of Complex Data** Jan 2000
Winter school in Firenze, Italy.
- Spontaneous Order of Life** Aug 1998
Summer school at Niels Bohr Institute, Denmark.
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Other professional activities:**Invited Talks:**

- Trinity College Dublin Aug 27, 2009
Oldenburg University Nov 6, 2009

Reviewer for *Perception & Psychophysics*, *PLoS One*, *Physical Review Letters*, *Physical Review E* and *NIPS*.
Review Editor for *Frontiers in Integrative Neuroscience*. Ad hoc reviewer for *Journal of Neuroscience*.
