# ZOE M. BOUNDY-SINGER

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## EDUCATION

**University of Texas at Austin** *09/17 – Present*
Neuroscience PhD candidate
Committee: Robbe Goris, Wilson Geisler, Alex Huk, Xue-Xin Wei, & Samantha Santacruz
Thesis: Representation of uncertainty in macaque visual cortex

**University of Chicago** *09/12 – 06/16*
Bachelor of Science with Honors
Major: Biology ⋄ Neuroscience Specialization
Minor: Computational Neuroscience
Thesis: Speed invariance of texture perception

**Cold Spring Harbor Labs Neuroscience: Computational Vision** *07/22*
Course attendee

## RESEARCH EXPERIENCE

**Graduate student advised by Robbe Goris** *01/18 – Present*
*University of Texas at Austin – Center for Perceptual Systems*
Project: Representation of uncertainty in macaque visual cortex

**Rotation student advised by Thibaud Taillefumier** *09/17 – 12/17*
*University of Texas at Austin – Department of Neuroscience and Mathematics*
Project: Optimal tuning curves for efficient coding

**Research assistant & summer intern advised by Sliman Bensmaia** *10/13 – 09/16*
*University of Chicago – Department of Organismal Biology and Anatomy*
Project: Speed invariance of texture perception

**Summer research assistant advised by Huifang Xu** *06/13 – 09/13*
*University of Wisconsin – Madison - Department of Geoscience*
Project: Incorporation of trace elements in carbonate minerals

## AWARDS AND HONORS

UT Austin Center for Perceptual Systems Research Excellence Award *06/23*
Plexon Neuroscience Presenter Award *10/22*
University Graduate Continuing Fellowship, UT Austin *(covers stipend + tuition)* *09/22 – 08/23*
COSYNE Presenters Travel Grant *03/22*
Professional Development Award from the Graduate School, UT Austin *10/19, 10/21, & 11/22*
National Science Foundation Graduate Research Fellowship (**NSF–GRFP**) *08/19 – 07/22*
UT Austin Institute for Neuroscience (INS) training grant recipient *09/17 – 07/19*
University of Chicago - Dean's list scholar *09/12 – 06/16*

## PUBLICATIONS

**Boundy-Singer, Z. M.***, Ziemba, C. M*, Goris, R.T.L. Confidence as a noisy decision reliability estimate. Nature Human Behavior. (2023).

Henaff, O., **Boundy-Singer, Z. M.**, Meding, K., Ziemba, C. M, Goris, R.T.L. Representation of visual uncertainty through neural gain variability. Nature Communications 11, 2531 (2020).

**Boundy-Singer, Z. M.**, Saal, H.P., Bensmaia, S. J. Speed Invariance of Texture Perception. Journal of Neurophysiology 118(4), 2371-2377 (2017).

## PREPRINTS

**Boundy-Singer, Z. M.**, Ziemba, C. M, Henaff, O., Goris, R.T.L. How does V1 population activity inform perceptual certainty? https://doi.org/10.1101/2023.09.08.556926

## TALKS

Vision Science Society (VSS) selected talk *05/23*
*Title: Relating V1 population activity to perceptual orientation uncertainty.*

COSYNE Workshops: *03/23*
Computational mechanisms underlying decision uncertainty and confidence in brain and behavior
*Title: Perceptual confidence: computational and physiological mechanism*

INS Dialogues, UT Austin *02/22*
*Title: Decision confidence: computational and physiological mechanism*

Center for Perceptual Systems Seminar Series, UT Austin *11/21*
*Title: Representation of uncertainty by macaque V1 populations*

UT Austin INS recruitment talk *02/20*
*Title: Uncertainty in the primate visual system*

UT Austin INS recruitment talk *02/18*
*Title: Optimal tuning curves for efficient coding*

## POSTERS

**Boundy-Singer, Z. M**, Ziemba, C. M, Goris, R.L.T. Relating V1 population activity to perceptual orientation uncertainty. (March, 2023). COSYNE. Montreal, Canada.

Ziemba, C. M, **Boundy-Singer, Z. M**, Goris, R.L.T. Decoding momentary gain variability from neuronal populations. (March, 2023). COSYNE. Montreal, Canada.

**Boundy-Singer, Z. M**, Ziemba, C. M, Goris, R.L.T. Relating V1 population activity to perceptual orientation uncertainty. (November, 2022). Society for Neuroscience. San Diego, CA.

Ziemba, C. M, **Boundy-Singer, Z. M**, Goris, R.L.T. Decoding momentary gain variability from neuronal populations. (November, 2022). Society for Neuroscience. San Diego, CA.

**Boundy-Singer, Z. M**, Ziemba, C. M, Goris, R.L.T. Representation of Uncertainty by Macaque V1 Populations. (March, 2022). COSYNE. Lisbon, Portugal.

**Boundy-Singer, Z. M**, Ziemba, C. M, Goris, R.L.T. Representation of Uncertainty by Macaque V1 Populations. (November, 2021). Society for Neuroscience. Virtual.

Ziemba, C. M, **Boundy-Singer, Z. M**, Goris, R.L.T. Isolating metacognitive sensitivity with a process model for confidence. (November, 2021). Society for Neuroscience. Virtual.

**Boundy-Singer, Z. M**, Henaff, O., Meding, K., Ziemba, C. M, Goris, R.L.T. Representation of Sensory Uncertainty in Macaque Visual Cortex. (February, 2020). COSYNE. Denver, CO.

**Boundy-Singer, Z. M.**, Ziemba, C. M, Goris, R.L.T. Incentivizing, dissecting, and modeling human confidence judgments (October, 2019). Society for Neuroscience. Chicago, IL.

**Boundy-Singer, Z. M.**, Ziemba, C. M, Goris, R.L.T. (April, 2019). Incentivizing, dissecting, and modeling human confidence judgments. NETI. Austin, TX.

Saal, H. P., Lieber, J. D., **Boundy-Singer, Z. M.**, Weber, A. I., Bensmaia, S. J. (November, 2016). Inferring the neural representations underlying perceptual invariance in touch. Society for Neuroscience. San Diego, CA.

Lieber, J. D., Saal, H. P., **Boundy-Singer, Z. M.**, Weber, A. I., Bensmaia, S. J. (November, 2016). The coding of natural textures in primate somatosensory cortex. Society for Neuroscience. San Diego, CA.

Saal, H. P., Lieber, J. D., **Boundy-Singer, Z. M.**, Weber, A. I., Bensmaia, S. J. (October, 2015). Tactile texture invariance and its peripheral neural basis. Society for Neuroscience. Chicago, IL.

## OUTREACH

SURE (Summer Undergraduate Research Experience) mentor, UT Austin *06/23 - 08/23*
*Program aimed at exposing students from underrepresented backgrounds to research.*
Schrödinger's Pint: public science talk series *(lecturer)* *05/23*
Present Your PhD Program: Youth Science Workshop, UT Austin *(presenter)* *05/22*
Health Science Summer Camps, UT Austin *(lecturer)* *07/18*
UT Austin Neuroscience Undergraduate Reading Program Mentor (NURP) *01/18 – 5/20*
*Semesterly program in which mentors guide mentees in a neuroscience topic via primary literature review*
University of Chicago NEURO Club *09/13 – 06/16*
*Member of the neurosceince club who's mission is to bring neuroscience education to community members of all ages and backgrounds.*

## MENTORSHIP

*UT Austin:*
Quiana Jeffs, Ivan Zambrano, Nick Bastia, Ryan Truong *Goris Lab Undergraduate RA*
Elijah Johnson , Emily Andrade *SURE*
Rebbeca Moore, Thomas Jensen, Khue Tran, Che-Wei Chou, Mareena Zaheer, Michael Darmawan, Maher Rahman *NURP*

*University of Chicago:*
Molly O'Donnell, Katherine Reis *Bensmaia Lab Undergraduate RA*

## TEACHING

Instructor INS Bootcamp psychophysics module – UT Austin *8/22 & 23*
Teaching assistant for PSY 194 – Ethics and Professional Development – UT Austin *Spring 21 & 22*
*Responsibilities included curating weekly reading assignments, giving topical lectures, and leading class discussions*

## MEMBERSHIPS

Society for Neuroscience *09/15 – Present*

## SKILLS

MATLAB, Python, R programming language, LaTex, Adobe Illustrator