

Torben Noto

Postdoctoral Researcher

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<http://torbenator.github.io>

Education

2016-2022

Ph.D in Neuroscience, *Northwestern University*, Evanston IL.

Advisor: Christina Zelano

Thesis: Interactions between Olfactory and Respiratory Circuitry in the Human Amygdala

Committee: Joel Voss, Thorsten Kahnt, Robin Nusslock

2009-2013

B.S. in Neuroscience, *Bates College*, Lewiston ME.

Advisor: Jason Castro

Thesis: Genome-scale mapping of the accessory olfactory bulb

Varsity Lacrosse Captain, Bates Musicians Union, Bates Outing Club

Awards

T32 Cognitive Neuroscience Pre-Doctoral Training Grant 2017-2019

AChemS Pre-Doctoral Travel Award 2019

T32 Mechanisms of Aging and Alzheimer's Disease Post-Doctoral Training Grant 2022-2023

Publications

Quantity of SARS-CoV-2 RNA copies exhaled per minute during natural breathing over the course of COVID-19 infection

Lane G., Zhou G.... **Noto T.**, ... Zelano C.

eLife 2023

Automated analysis of breathing waveforms using BreathMetrics: a respiratory signal processing toolbox

Noto, T., Zhou, G., Schuele, S., Templer, J., & Zelano, C.

Chemical Senses 2018

Human Primary Olfactory Amygdala Subregions Form Distinct Functional Networks, Suggesting Distinct Olfactory Functions

Noto T., Zhou G, Yang Q, Lane G, Zelano C.

Frontiers in Systems Neuroscience 2021

Genome-scale investigation of olfactory system spatial heterogeneity

Noto, T., Barnagian, D., & Castro, J. B.

PLOS ONE 2017

HFOApp: A MATLAB Graphical User Interface for High-Frequency Oscillation Marking

Zhou, G., **Noto, T.**, Sharma, A., Yang Q., Gonzalez, O., Tate, M., Templer, J., Lane, G., Zelano, C.
eNeuro 2022

Assessment of direct knowledge of the human olfactory system

Lane, G., Zhou, G., **Noto, T.**, & Zelano, C.
Experimental Neurology 2020

Anticipation-induced delta phase reset improves human olfactory perception

Arabkheradmand, G., Zhou, G., **Noto, T.**, Yang, Q., Schuele, S. U., Parvizi, J., Gottfried, J. A., Wu, S.,
Rosenow, J. M., Koubeissi, M. Z., Lane, G., & Zelano, C.
PLOS Biology 2020

Parameterizing neural power spectra into periodic and aperiodic components

Donoghue, T., Haller, M., Peterson, E. J., Varma, P., Sebastian, P., Gao, R., **Noto, T.**, Lara, A. H., Wallis, J. D.,
Knight, R. T., Shestyuk, A., & Voytek, B.
Nature Neuroscience 2020

Human olfactory-auditory integration requires phase synchrony between sensory cortices

Zhou, G., Lane, G., **Noto, T.**, Arabkheradmand G., Gottfried J., Rosenow, J., Olofsson, J., Wilson, D.,
Zelano, C.
Nature Communications 2019

Expected Publications

Seeing a face rapidly suppresses inhalation

Noto, T., Zhou, G., Yang, Q., Lane, G., Zelano, C.
Nature Human Behavior

Poster Presentations

2022

A Pilot Study Measuring The Proteome of Nasal and Oral Breath in Alzheimer's Disease

Lane G., Noto T., Lehmann S., Sheriff A., Yang Q., Bonakdarpour B., Mastrianni, J.A., Jamka J., Savas J.,
Hauner, K., Zelano C.
Society for Neuroscience Annual Meeting

2021

Functional Connectivity of Human Primary Olfactory Amygdala Sub-Nuclei

Noto, T., Zhou, G., Lane, G., Yang, Q., Zelano, C.
Association for Chemoreception Sciences Annual Meeting

2020

A Fast Fear Pathway From the Human Retina to Respiratory Muscles

Noto, T., Zelano, C.
NUIN student recruitment

2019

Investigating the olfactomotor role of medial and central subdivisions of the amygdala in humans
Noto, T. Zhou, G., Lane, G., Zelano, C.
European Chemoreception Research Organization Meeting

The Role of the Medial and Central Nuclei of the Amygdala in Olfaction
Noto, T., Zhou, G., Lane, G., Zelano, C.
Association for Chemoreception Sciences Annual Meeting

Investigating the olfactory roles of medial and central subdivisions of the human amygdala
Noto, T., Zhou, G., Lane, G., Zelano, C.
Society for Neuroscience Annual Meeting

2018

Automated Analysis of Sniffing Using BreathMetrics: A Respiratory Signal Processing Toolbox
Noto, T., Zhou, G., Zelano, C.
Association for Chemoreception Sciences Annual Meeting & OIST olfaction workshop

Enabling Respiration as a Biomarker for Mental Health With Automatic Feature Extraction of Human Breathing Recordings
Noto, T., Zhou, G., Zelano, C.
Northwestern Biomedical Data Science Day

2017

Evaluating Anxiety-Mediated Respiratory Dynamics in Response to Fearful and Surprised Faces
Noto, T., Arora., N. Soltani, M., & Zelano, C
Society for Neuroscience annual meeting

Evaluating Anxiety-Mediated Respiratory Dynamics in Response to Fearful and Surprised Faces
Noto, T., Arora., N. Soltani, M., & Zelano, C
American Psychiatric Association annual meeting

2016

Data Mining to Generate Novel Hypotheses for the Genetic Underpinnings and Functional Roles of Cortical Oscillations
Sebastian, P., Donoghue, T., Noto, T., Haxby, S., Voytek, B.
Society for Neuroscience annual meeting

2015

Neural Network Properties Can Be Inferred From Electrophysiological Power Spectral Geometry
Noto, T., Cole, S.R., Gao, R.G., Peterson, E.J., Voytek B.
Society for Neuroscience annual meeting

Slope of High Gamma Reduces Phase Amplitude Coupling in Human and Animal Models
Noto, T., Voytek B.
Cognitive Neuroscience Society annual meeting

2014

Automatic Spectral 'Fingerprinting' of Electrophysiological Oscillations
Haller, M., Varma, P., Noto, T., Knight, R.T., Shestyuk, A.Y., Voytek, B.
Society for Neuroscience annual meeting

2013

Genome-Scale Analysis of Heterogeneity in the Mouse Accessory Olfactory System

Noto, T., Castro, J.B.

National Conference for Undergraduate Research

Oral Presentations

2022

Introduction to Olfaction

Walter Payton College Prep

2020

Introduction to the Human Olfactory System

NUIN 434 Systems Neuroscience

A fast fear circuit in the amygdala may link the retina to the respiratory system

Northwestern Computational Neuroscience Club

2019

Considering The Olfactory Amygdala in Respiratory Control and SUDEP

Neurology Department Lecture Series

The Role of Medial Subdivisions of the Amygdala in Olfaction – T32 Training Day Lecture

Interactions Between Emotional Processing, Respiratory Phase, and Anxiety

T32 Work in Progress Meeting

Data Science and Big Data in Neuroscience

Northwestern Computational Neuroscience Club

Introduction to Olfaction

Walter Payton College Prep

2018

Investigating the Interactions Between Cognition, Mental Health, and Breathing

Northwestern Center for Brain Mapping and Cognition Seminar

Breathing, Cognition, and the Amygdala

Northwestern Center for Brain Mapping and Cognition T32 Work In Progress Meeting

Philosophy of Mind and Brain Computer Interfaces

High school lecture presented at Walter Payton College Prep and Lindblom Math and Science Academy

Scientific Tools

BreathMetrics: Algorithm that extracts features in breathing recordings (Noto et al. 2018)

<https://github.com/zelanolab/breathmetrics>

HFOApp: Software for technicians and doctors that labels epilepsy activity in iEEG recordings (Zhou et al. 2022)

<https://github.com/zelanolab/hfoapp>

Fitting Oscillations One Over F (FOOOF): A codebase for parameterizing neural power spectra (Donoghue et al. 2020)

<https://github.com/voytekresearch/foof>

Data mined semi-automatic hypothesis generation for gene to cognitive function relationships

<https://github.com/voytekresearch/nsaba/>

Algorithmic estimation of spiking from concurrent calcium currents

https://github.com/torbenator/calcium_spikes

Toolbox that converts images into songs where the notes and rhythms are defined by the spatial intensity of the image

<https://github.com/torbenator/prettysounds>

Computationally modeling surging and strain on public bus usage as contribution to San Diego Smart City Hackathon

<http://neurosciencebro.blogspot.com/2016/05/my-first-hackathon.html>

Text-based clustering and analysis of scientific topics at a cognitive neuroscience conference <http://neurosciencebro.blogspot.com/2015/09/the-cns-annual-meeting-should-be-called.html>

Professional Experience

Data Scientist, *Classy Inc.*, San Diego CA. Summer 2016

Supervisor: Ben Cippolini

Lab Manager, *UC San Diego*, San Diego CA. 2014-2016

Supervisor: Bradley Voytek

Research Technician, *Omniox*, San Carlos CA. 2013-2014

Supervisor: Natacha LeMoan

Cognitive Neuroscience Intern, *Nike Inc.*, Beaverton OR. Summer 2012

Supervisor: Herb Yoo

Research Assistant, *Oregon Health and Science University*, Portland OR. Summer 2011

Supervisor: Joseph Quinn