# David Deutsch

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Multi-purpose building
University of Haifa, Israel
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## CURRENT POSITION

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| Principal Investigator | University of Haifa, Israel | 2022 - current |

## EDUCATION

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| Postdoctoral research associate | Princeton University, USA | 2014 - 2022 |
| Ph.D. student, Neurobiology | Weizmann Institute of Science, Israel | 2008 - 2013 |
| MSc, Electrical Engineering* | Tel Aviv University, Israel | 2007 |
| BSc, Electrical Engineering | Tel Aviv University, Israel | 2006 |

* Direct MSc path for outstanding BSc students

## FUNDING

1. Zuckerman STEM leadership program (October 2022-September 2026)
2. Contributed data and figures for two funded NIH BRAIN initiative projects: 1) 'Population neural activity mediating sensory perception across modalities' (1R01NS110060, 2019-2023) and 2) 'Dissecting Sensorimotor Pathways Underlying Social Interactions: Models, Circuits, and Behavior' (1RO1NS104899, 2018-2022)
3. Recording from the barrel cortex of freely moving rats during a localization task. Collaboration with Prof. Anton Sirota, Germany, Berlin Family Foundation New Scientist Fund, WIS Project Number: 720664 (with Prof. Ehud Ahissar, 2012)
4. Whisking in a natural-like environment: A quantitative comparison between rodent strains, Kahn Family Center for Systems Biology (student research proposal, 2011)
5. Partial on-line guidance of surgical brain implants, Yeda-Sela Center of the Weizmann Institute of Technology (2011)

## TECHNICAL CONTRIBUTIONS

1. Developed a multisensory virtual reality setup for monitoring brain activity under a two-photon microscope (with Stephan Thiberge, Bezos Center, Princeton Neuroscience Institute),

including Python interface for fly motion tracking and control of multisensory stimuli (https://github.com/murthylab/fly-vr).

2. Contributed to the development of an automated tool for neural segmentation in an Electron Microscopy dataset of an entire adult *Drosophila* brain (https://flywire.ai/ [3]).
3. Contributed to the development of SLEAP, a framework for multi-animal pose tracking via deep learning.

PUBLICATIONS

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1. Lin A., Yang R., Dorkenwald S., Matsliah A., Deutsch D., Seung S., Murthy M. Network properties of the whole-brain Drosophila connectome. APS March meeting (2023). Will be on bioRxiv in Feb 2023.
2. Tomomi K., **Deutsch D.**, Flexibility in neural circuits regulating mating behaviors in mice and flies. Frontiers in Neural circuits 16 (2022).
3. Pereira T., Tabris N., Matsliah A., Turner D., Li J., Ravindranath S., Papadoyannis E., Normand E., **Deutsch D.**, Wang Z. Y., McKenzie-Smith G., Mitelut C., Castro M., D'Uva J., Kislin M., Sanes D, Sa D. Kocher S., Wang S., Falkner A., Shaevitz J., Murthy M. SLEAP: a deep learning system for multi-animal pose tracking. Nature Methods 19, 486-495 (2022).
4. Dorkenwald S.*, McKellar C.*, Macrina T.*, Kemnitz N.*, Lee K.*, Lu R.*, Wu J.*, Popovych S., Mitchell E., Nehoran B., Jia Z., Bae J. A., Mu S., Ih D., Castro M., Ogedengbe O., Halageri A., Ashwood Z., Zung J., Collman F., Schneider-Mizell C., Jordan C., Silversmith W., Baker C., **Deutsch D.**, Encarnacion-Rivera L., Kumar S., Burke A., Gager J., Hebditch J., Koolman S., Moore M., Morejohn S., Silverman B., Willie K., Willie R., Yu SC., Li K., Murthy M., Seung H. S. (* Equal contribution). Online community for whole-brain connectomics. Nature Methods 19, 119-128 (2021).
5. **Deutsch D.**, Pacheco DA., Encarnacion-Rivera LJ., Pereira T., Fathy R., Clemens J., Girardin C., Calhouln AJ., Ireland EC., Burke AT., Dorkenwald S., McLellar C., Macrina T., Lu R., Lee K., Kemnitz N., Ih D., Castro M., Halageri A., Jordan C., Silversmith W., Wu J., Seung HS., Murthy M. The neural basis for a persistent internal state in *Drosophila* females. bioRxiv: https://doi.org/10.1101/2020.02.13.947952 (2020). eLife 9:e59502 DOI: 10.7554/eLife.59502 (2020).
6. **Deutsch D**.*, Clemens J.*, Thiberge SY., Guan G., Murthy M. (* Equal contribution). Shared song detector neurons in *Drosophila* male and female brains drive sex-specific behaviors. bioRxiv: https://doi.org/10.1101/366765 (2018). Current Biology 29, 3200-3215 (2019).

7. Wallach A.*, **Deutsch D.***, Oram T.*, Ahissar E. (* Equal contribution). Predictive whisker kinematics reveal context dependent attentional shifts. PLoS Biol 18(5) (2020)
8. **Deutsch D.**, Schneidman E., Ahissar E. Generalization of object localization from whiskers to other body parts in freely-moving rats. Front. Integr. Neurosci. (2019)
9. Sherman D., Oram T., **Deutsch D**., Gordon G., Ahissar E., and Harel D. Tactile modulation of whisking via the brainstem loop: Statechart modeling and experimental validation. PLoS ONE 8, e79831 (2013)
10. Bagdasarian K*., Szwed M.*, Knutsen PM.*, **Deutsch D**.*, Derdikman D., Pietr M. Simony E. and Ahissar E. (* Equal contribution). Pre-neuronal morphological processing of object location by individual whiskers. Nat. Neurosci. 16, 622–631 (2013)
11. **Deutsch D.**, Pietr, M., Knutsen P.M., Ahissar E. and Schneidman E. Fast feedback in active sensing: touch-induced changes to whisker-object interaction. PLoS ONE **7**, e44272 (2012)
12. **Deutsch D.**, Natan A., Shapira Y. and Kronik L., Electrostatic Properties of Adsorbed Polar Molecules: Opposite Behavior of a Single Molecule and a Molecular Monolayer. J. AM. CHEM. SOC. 129, 2989-2997 (2007)

Manuscripts in progress

1. Normand E., Wang M., Murthy M., **Deutsch D.**, Visual and auditory cues shape fast social response in *Drosophila* females. In preparation.
2. **Deutsch D.***, Wang K.*, Matsliah A., Dickson B., Murthy M., (* Equal contribution). The connectome of sexually dimorphic cells in the *Drosophila* brain. In preparation.

## SELECTED PRESENTATIONS

Oral presentations

1. **Deutsch D.**, Neural circuits for mating and aggressive behaviors in *Drosophila.* Seminar at Ben Gurion University (2022)

2. **Deutsch D.**, Sexually dimorphic circuits for mating and aggressive behaviors in *Drosophila*. A research workshop: Sexual dimorphism of neuronal circuits and behavior. Weizmann Institute, Israel (2022)

3. **Deutsch D.** Neural circuits for flexible social behaviors (virtual). Department of neurobiology, University of Haifa, Israel (2021)
4. **Deutsch D.** Neural circuits for flexible social behaviors (virtual). Department of medical neurobiology and department of cognition, Hebrew university, Israel (2020)
5. **Deutsch D.** Neural circuits for flexible social behaviors (virtual), Faculty of Medicine, Technion, Israel (2021)
6. **Deutsch D.**, Pacheco D., Encarnacion-Rivera L., Pereira T., Fathy R., Calhoun A., Ireland E. FlyWire Team and Murthy M. Internal brain states shape social communication in *Drosophila* female. ISFN (virtual), Eilat, Israel (2021)
7. **Deutsch D.**, Pacheco D., Encarnacion-Rivera L., Pereira T., Fathy R., Calhoun A., Ireland E. FlyWire Team and Murthy M. The neural basis for persistent internal state in *Drosophila* female. Neural Circuits. CSHL (virtual), NY, USA (2020)
8. **Deutsch D.**, Pacheco D., Encarnacion-Rivera L., Pereira T., Fathy R., Seung S., Murthy M. Social communication and sensorimotor transformation. Department of medical neurobiology, the Hebrew university Hadassah medical school, Israel (2020)
9. **Deutsch D.**, Pacheco D., Encarnacion-Rivera L., Pereira T., Fathy R., Seung S., Murthy M. Social communication and sensorimotor transformation. ISFN, Eilat, Israel (2020)
10. **Deutsch D.**, Clemens J., Murthy M. Connecting neural and behavioral tuning for acoustic communication signals. ISFN, Eilat, Israel (2017)
11. **Deutsch D.**, Clemens J., Murthy M. From courtship song processing to behavior in *Drosophila*. Sense to Synapse, NYU university, USA (2017)
12. **Deutsch D.**, Clemens J., Murthy M., From courtship song to behavior in *Drosophila*. Neurobiology of Drosophila. CSHL, NY, USA (2017)
13. **Deutsch D.**, Schneidman E., Ahissar E., The use of whiskers and body in object localization. ISFN, Eilat, Israel (2011)
14. **Deutsch D.**, Pietr PM., Knutsen PM., Ahissar E., Schneidman E., Closed loop whisking – effects of contact. Barrels meeting, San-Diego, USA (2010)
15. **Deutsch D.**, Pietr PM., Knutsen PM., Ahissar E., Schneidman E., Contact-induced feedback on rat whisking. BIOTACT consortium meeting, Garmisch-Partenkirchen, Germany (2010)
16. **Deutsch D.**, Pietr PM., Knutsen PM., Ahissar E., Schneidman E., Contact-induced feedback during whisking. ISFN meeting, Eilat, Israel (2009)

<u>Poster presentations</u>

1. Normand E., **Deutsch D.**, Pereira T., Rangarajan N., Wang M., Murthy M., Investigation of a multilevel multisensory circuit underlying female decision making in Drosophila. COSYNE, Lisbon, Portugal (2022)
2. **Deutsch D.**, Pacheco D., Encarnacion-Rivera L., Pereira T., Fathy R., Seung S., Murthy M. Investigation of a persistent internal state in female flies. CSHL, NY, USA (2019)
3. **Deutsch D.**, Pacheco D., Pereira T., Fathy R., Encarnacion-Rivera L., Murthy M. Investigation of a persistent arousal state in female flies. Gordon meeting: Modulation of neural circuit and behavior. Les Diableretes, Switzerland (2019)
4. **Deutsch D.**, Thiberge S., Calhoun A., Turner D., Murthy M. Population neural activity mediating sensory perception across modalities. The BRAIN initiative investigators meeting, Washington DC, USA (2019)
5. **Deutsch D.**, Clemens J., Murthy M., Feature detectors drive dimorphic behaviors in Drosophila. COSYNE, Denver, USA (2018)
6. Barak N., **Deutsch D**., Shapiro A., Gordon G., Assa E., Oram T., Yizhar O., Ahissar E., Kimchi T. High resolution analysis of sniffing-whisking patterns during object-approach in autism-related mouse models. ISFN, Eilat, Israel (2013)
7. **Deutsch D.**, Ebert C., Schneidman E., Ahissar E. Cortical activity in the barrel cortex during a localization task. ISFN, Eilat, Israel (2013)
8. **Deutsch D.**, Schneidman E., Ahissar E., Object localization in freely moving rats. FENS, Barcelona, Spain (2012)
9. **Deutsch D.**, Pietr PM., Knutsen PM., Ahissar E., Schneidman E., Contact-induced feedback during whisking. SFN, San-Diego, USA (2010)
10. **Deutsch D.**, Pietr PM., Knutsen PM., Ahissar E., Schneidman E., Contact-induced feedback on rat whisking. FENS, Amsterdam, The Netherlands (2010)
11. **Deutsch D.**, Pietr PM., Knutsen PM., Ahissar E., Schneidman E., Active whisking: effects of touch. ISFN, Eilat, Israel (2010)

## TEACHING EXPERIENCE

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| International summer school: Physics of life (virtual) | 2020 |
| Summer course: Neurotechnologies for analysis of neural dynamics. Princeton, NJ, USA | 2017 |

## PROFESSIONAL AFFILIATIONS

Review editor on the editorial board of Frontiers in Cellular Neuroscience 2021 - current

## MENTORING EXPERIENCE

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| Amir Gross, University of Haifa, MSc student | 2022 - current |
| Edna Normand, Princeton Neuroscience MD/Ph.D. student | 2019 - current |
| Lucas Encarnacion-Rivera, HHMI Summer student | 2019 |
| Ramie Fathy and Ankush Rakhit. Princeton University senior thesis students | 2015, 2018 |
| Tal Tamir, Efrat Megidov. MSc students, Weizmann Institute, Israel | 2011, 2012 |
| Harris Kaplan, Eran Agmon Summer internships, Weizmann Institute, Israel | 2008, 2009 |

## TRAINING

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| CSHL, NY, USA | Scientific writing retreat | 2018 |
| Princeton, NJ, USA | Presenting data and information | 2018 |
| San Diego, CA, USA | Data science and data skills for neuroscientists | 2016 |
| CSHL, NY, USA | Imaging structure and function in the nervous system | 2014 |
| FENS-IBRO School, Italy | Causal Neuroscience: Interacting with neural circuits | 2011 |

## MILITARY SERVICE

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| F-16 Co-Pilot in the Israeli Air Force. Rank: Major | 1994 – 2000 |

## OUTREACH

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| Public talk at the Princeton Jewish center, Princeton, NJ, USA | 2019 |
| Public talk for Crossroads nursery school fund raising, Princeton, NJ, USA | 2019 |
| Public talk during ‘STEM expo day’, CP public school, Princeton, NJ, USA | 2018, 2019 |
| Public talk during ‘Science on tap’ event, Tel Aviv, Israel | 2011, 2012 |