

# Mohamed Abdelhack

POSTDOCTORAL FELLOW · KREMBIL CENTRE FOR NEUROINFORMATICS

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## Education

### Kyoto University

PHD INFORMATICS

- Advisor: Prof. Yukiyasu Kamitani

Kyoto, Japan

2015 - 2019

### Okinawa Institute of Science and Technology

MSC SCIENCE AND TECHNOLOGY

- Advisor: Dr. Ichiro Maruyama

Okinawa, Japan

2012 - 2015

### Alexandria University

BSC ELECTRICAL ENGINEERING

- Communications and Electronics Department
- Honors thesis/undergrad research advisor: Dr. Hania Farag

Alexandria, Egypt

2008 - 2012

## Professional Experience

- 2021- **Postdoctoral Fellow**, Krembil Centre for Neuroinformatics, Centre for Addiction and Mental Health
- 2019-2021 **Postdoctoral Research Assistant**, Department of Anesthesiology, Washington University in St. Louis
- 2018-2019 **Researcher**, Graduate School of Medicine, Kyoto University
- 2015-2018 **Research Assistant**, Graduate School of Informatics, Kyoto University
- 2015-2018 **Student Intern**, Department of Neuroinformatics, Advanced Telecommunication Research Institute
- 2011 **Summer Intern**, Laboratory of Neural Injury and Repair, Wadsworth Center

## Publications

### PUBLISHED

- Hueniken, Katrina; Somé, Nibene Habib; **Abdelhack, Mohamed**; Taylor, Graham; Marshall, Tara Elton; Wickens, Christine M; Hamilton, Hayley A; Wells, Samantha; Felsky, Daniel. 2021. Machine Learning-Based Predictive Modeling of Anxiety and Depressive Symptoms During 8 Months of the COVID-19 Global Pandemic: Repeated Cross-sectional Survey Study. JMIR mental health 2021.
- Fritz, Bradley A; **Abdelhack, Mohamed**; King, Christopher R; Chen, Yixin; and Avidan, Michael S. 2020. Update to 'Deep-learning model for predicting 30-day postoperative mortality'(Br J Anaesth 2019; 123: 688-95). BJA: British Journal of Anaesthesia.
- Abdelhack, Mohamed** and Kamitani, Yukiyasu. 2018. Sharpening of hierarchical visual feature representations of blurred images. Eneuro.
- Nedelescu, Hermina; **Abdelhack, Mohamed**; and Pritchard, Arwel T. 2018. Regional differences in Purkinje cell morphology in the cerebellar vermis of male mice. Journal of neuroscience research.
- Nedelescu, Hermina and **Abdelhack, Mohamed**. 2013. Comparative morphology of dendritic arbors in populations of Purkinje cells in mouse sulcus and apex. Neural Plasticity.

### IN REVIEW

- Ortiz, Abigail; Sanches, Marcos; **Abdelhack, Mohamed**; Schwaiger, Tyler R; Wainberg, Michael; Tripathy, Shreejoy J; Felsky Daniel; Mulsant Benoit H; Fiedorowicz Jess G. Sex-specific associations between lifetime diagnosis of bipolar disorder and cardiovascular disease: a cross-sectional analysis of 257,673 participants from the UK Biobank. Journal of Affective Disorders

Tripathi, Sandhya; Fritz, Bradley A; **Abdelhack, Mohamed**; Avidan, Michael S; Chen, Yixin; and King, Christopher R. Deep learning to jointly schema match, impute and transform databases.

## IN PREP

**Abdelhack, Mohamed**; Zhang, Jiaming; Tripathi, Sandhya; Fritz, Bradley A; Feslky, Daniel; Avidan, Michael S; Chen, Yixin; and King, Christopher R. A Modulation Layer to Increase Neural Network Robustness Against Data Quality Issues.

**Abdelhack, Mohamed**; Murakami, Akio; Majima, Kei; Cheng Fan; Kamitani, Yukiyasu and Takahashi, Hidehiko. 2018. Analysis of top-down and bottom-up processes of visual recognition in schizophrenia using deep neural network models

## Awards, Fellowships, Honors, & Grants

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2022	<b>Highlighted Reviewer of ICLR 2022</b> , International Conference on Learning Representations	
2019	<b>Fourth Place in Image Recognition Hackathon</b> , AI Hack Tunisia	<i>Internship Offer</i>
2018	<b>Monbukagakusho Scholarship</b> , Japanese Ministry of Education, Culture, Sports, Science and Technology	¥1.1 M
2017	<b>Monbukagakusho Scholarship</b> , Japanese Ministry of Education, Culture, Sports, Science and Technology	¥2.3 M
	<b>Summer School Cost Waiver</b> , Computational and Cognitive Neuroscience Summer School	\$US 1500
2016	<b>Tuition Exemption Award</b> , Kyoto University	¥535,800
2015	<b>Tuition Exemption Award</b> , Kyoto University	¥267,900
	<b>Admission Fee Waiver Award</b> , Kyoto University	¥282,000
2010	<b>Cairo International Biomedical Engineering Conference Registration Fee Grant</b> , Misr El Kheir Foundation	£EG 100

## Presentations

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\* *presenting author*; + *mentored undergraduate*

### INVITED TALKS

May 2022. *Computational Neuroscience and Applications in Medicine*. Invited webinar: IEEE Engineering in Medicine and Biology Society American University of Sharjah Student Branch, Online.

Apr 2022. *Computational Neuroscience (Arabic)*. Invited webinar: Egypt Scholars.

Apr 2022. *Computational Neuroscience (Arabic)*. Invited webinar: Birzeit University, Online.

Dec 2020. *Top-down modulation in human visual cortex*. Invited webinar: Society for Neuroscientists of Africa.

### CONTRIBUTED PRESENTATIONS

Elsherif, Omar<sup>++</sup>, **Abdelhack, Mohamed**. 2021. Modeling Image Sharpening in Human Visual Cortex Using Computer Vision Models. Flash Talk: Neuromatch Conference 4.0.

**Abdelhack, Mohamed**<sup>\*</sup>. 2021. Modulation Layer for Combating Missing Data. Oral Talk: Anesthesiology Research Data Blitz, Washington University in St. Louis, St. Louis, MO.

**Abdelhack, Mohamed**<sup>\*</sup> and Kamitani, Yukiyasu. 2020. Visual Misrecognition Reveals Contradiction between Lower and Higher Visual Cortex Activations. Flash Talk: Neuromatch Conference 3.0.

**Abdelhack, Mohamed**<sup>\*</sup>; King, Christopher R; Tripathi, Sandhya; Fritz, Bradley; Chen, Yixin; Avidan, Michael. 2020. Postoperative Mortality Prediction with and Without the Use of Intraoperative Features. Poster: AMIA 2020 Symposium.

- Abdelhack, Mohamed\*** and Kamitani, Yukiya. 2019. Top-down Modulation in Human Visual Cortex Revealed by Brain Decoding with Deep Neural Network Representation. Poster Presentation: CiNet Conference, Osaka, Japan.
- Murakami, Akio\*; **Abdelhack, Mohamed\***; Majima, Kei; Cheng Fan; Kamitani, Yukiya and Takahashi, Hidehiko. 2019. Representational structure of the higher visual cortex in schizophrenia. Poster Presentation: Mechanism of Brain and Mind Winter Workshop, Hokkaido, Japan.
- Murakami, Akio\*; **Abdelhack, Mohamed\***; Majima, Kei; Cheng Fan; Kamitani, Yukiya and Takahashi, Hidehiko. 2018. Analysis of top-down and bottom-up processes of visual recognition in schizophrenia using deep neural network models. Poster Presentation: International Consortium on Hallucination Research, Kyoto, Japan.
- Abdelhack, Mohamed\*** and Kamitani, Yukiya. 2017. Top-down neural processing that supplements missing image features revealed by brain decoding with deep neural network representation. Poster Presentation: Vision Science Society Annual Meeting, St. Pete Beach, FL.
- Nedelescu, Hermina\*; **Abdelhack, Mohamed**; and Pritchard, Arwel T. 2016. Purkinje cell heterogeneity in the anterior and posterior cerebellar lobule. Dynamic Poster Presentation: Society for Neuroscience annual meeting, San Diego, CA.
- Abdelhack, Mohamed\*** and Maruyama, Ichiro. 2015. Locomolyzer: a comprehensive tool for animal locomotion analysis. Congress of the European Society of Biomechanics, Prague, Czechia.
- Abdelhack, Mohamed\***. 2014. Adaptation in locomotion behavior of *Caenorhabditis elegans*. Okinawa Computational Neuroscience Course, Okinawa, Japan.
- Abdelhack, Mohamed\*** and Nedelescu, Hermina. 2013. Investigating the effect of anatomical location on Purkinje cell morphology. Poster Presentation: Society for Neuroscience annual meeting, San Diego, CA.

## Teaching Experience

August 2022	<b>IBRO-Simons Computational Neuroscience Imbizo</b> , Teaching Assistant (upcoming)	Cape Town, South Africa
June 2022	<b>Introduction to Computational Neuroscience</b> , Lecturer (upcoming)	Online
Summer 2020	<b>Neuromatch Academy</b> , Lead Teaching Assistant	Online

## Mentoring

2021-	<b>Abd alrhman Mostafa</b> , Mentee, Arabs in Neuroscience	Online
2021	<b>Omar ElSharif</b> , Mentee, Arabs in Neuroscience	Online
2020-2021	<b>Jiaming Zhang</b> , Intern, Department of Computer Science, Washington University in St. Louis	Online
2020-2021	<b>Jerome Gammie</b> , Intern, Department of Computer Science, Washington University in St. Louis	St. Louis MO

## Outreach & Professional Development

### SERVICE AND OUTREACH

2020-	<b>Arabs in Neuroscience</b> , Founder	Online
2021-	<b>The Africa I Know</b> , Mentorship Team Member	Online
2021	<b>Neuromatch Academy</b> , Chief Communication Officer & Outreach Coordinator	Online
2021	<b>Neuromatch Academy Computational Neuroscience Summer School</b> , Project Mentor	Online
2019-2021	<b>Washington University Postdoc Society</b> , Policy Committee Member	St. Louis MO
2013	<b>An Introduction to Interdisciplinary Science Workshop</b> , Instructor	Okinawa, Japan
2012	<b>IEEE Alexandria Student Branch</b> , C Programming Instructor	Alexandria, Egypt
2011	<b>Brain-Computer Interfacing Challenge</b> , Judging Panel Member	Albany, NY

## DEVELOPMENT

**Careers in Neuroscience Panel Discussion**, invited by Alexandria Neuroscience Committee.

**Computational and Cognitive Neuroscience Summer School 2017**, New York University Shanghai, China.

**OIST Computational Neuroscience Course 2014.**, Okinawa, Japan.

## PEER REVIEW

### Journals

Neural Network

PLOS One

British Journal of Anaesthesia

Journal of Biomedical Informatics

### Conferences

The Conference on Neural Information Processing Systems (NeurIPS)

International Conference on Learning Representations (ICLR)

The International Joint Conference on Artificial Intelligence (IJCAI)

IEEE Big Data

## PROFESSIONAL MEMBERSHIPS

Society for Neuroscience