

## RACHEL VAN DRUNEN

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### EDUCATION

MD Anderson Cancer Center UT Health Houston Graduate School of Biomedical Sciences

**Ph.D., Neuroscience, 2024**

*Dissertation: "The role of the BMAL1 driven PVN clock as a central coordinator of energy rhythms"*

Trinity University

**Bachelor of Science (B.Sc.), Neuroscience, 2018**

### RESEARCH

**Postdoctoral Researcher** – Alexander Fleischman Lab: Systems Neuroscience

**July 2024 - Present**

*Brown University, Providence RI*

- Heading a project focused on the emergence of pregnancy and motherhood behaviors using mouse models.

**Fulbright Open Study Research Fellowship** – Gad Asher Lab: Chronobiology

**January 2024-June 2024**

*The Weizmann Institute of Science, Rehovot Israel*

- Analyzed single cell RNA sequencing (scRNAseq) of lung tissue collected from double BMAL1-HIF1alpha liver knockout mice.
- Revealed changes in the lung cell landscape along with significant transcriptional changes of immune regulated pathways (Dandavate...[Van Drunen](#) et al., *Cell Metabolism* 2024).

**Doctoral Researcher** - Kristin Eckel-Mahan Lab: Chronobiology & Molecular Neuroscience

**2019- 2023**

*Metabolic Diseases and Disorders at UT Health Science Center in Houston, Houston TX*

- Dissertation: [Van Drunen](#) et al., *Cell Reports*, 2024
  - Investigated BMAL1's chromatin and transcriptional dynamics across time and cell types using cutting edge high throughput sequencing techniques (chromatin immunoprecipitation sequencing and scRNAseq).
  - Showed loss of BMAL1 in the PVN of the hypothalamus disrupts metabolic, feeding and activity rhythms and peripheral metabolic tissue clock rhythms.
  - Identified Oxytocin, a PVN produced neurohormone, as a key regulator of the PVN clock.
- Collaborated with multiple labs on exciting projects involved in aging (Gao...[Van Drunen](#) et al., *Aging Cell* 2024), metabolism (Ferky...[Van Drunen](#) et al., *The FASEB Journal* 2022), exercise (Sopariwala...[Van Drunen](#) et al., *The FASEB Journal* 2023), and circadian phenotyping ([Van Drunen](#) et al., *In preparation*).
- Mentored and trained 5 students in a range of wet lab techniques and provided graduate school/research advice.
- Received over \$50,000 in private funding and over \$100,000 in government funding. Published 1 first author manuscript and 2 review papers. Worked on 3 projects. Collaborated on 6 publications. Mentored 5 students. Invited to give talks at 2 international conferences and 1 local conference.

**Undergraduate Researcher** – Dany Munoz-Pinto Lab: Biomedical Engineering

**2017-2018**

*Department of Engineering at Trinity University, San Antonio TX*

- Characterized and fine-tuned multi-interpenetrating networks (mIPNs) to provide a 3D model that closely mimics the viscoelastic properties of extracellular matrix native to brain tissue ([Van Drunen](#) et al., *ACS Applied Biomaterials* 2019).
- Cultured and entrapped human astrocytes into the gels to demonstrate the mIPNs' resistance to cellular degradation and the maintenance healthy astrocytic function (Jimenez-Vergara...[Van Drunen](#) et al., *Scientific Reports*, 2020).
- Provided a potential tunable mIPN which more closely recapitulates the *in vivo* brain environment compared to the standard 2D culture flasks, thereby promoting an improved model to study brain cells *in vitro*.
- Received an institutional fellowship. Published 1 first author and 1 second author paper. Presented 1 poster at an international conference. Invited as a speaker at 1 local conference.

**Summer Undergraduate Researcher**

**Summers 2014 -2016**

*Department of Epidemiology at MD Anderson Cancer Center, Houston TX (2016) – Michelle Hildebrandt Lab*

- Analyzed RNA sequenced data from cardiomyocytes chronically exposed to varied concentrations of chemotherapy drug, Doxorubicin.
- Identified genes in the cardiac contraction pathway with altered expressions levels as potential future drug targets.

*Regenerative Medicine Research Lab at Texas Heart Institute, Houston TX (2014 & 2015) – Doris Taylor Lab*

- Worked with a team of 5 on a project to develop a non-thrombogenic biological assist device for Fontan patients.
- Demonstrated porcine bladder submucosa as a potential biocompatible material that can be decellularized, reformed into a vertical structure and re-endothelialized to aid blood circulation in Fontan patients.

#### SELECTED AWARDS AND SCHOLARSHIPS

- 2023 President's Research Scholarship** - MD Anderson UTHealth Graduate School of Biomedical Sciences (GSBS)
- 2023 Fulbright US Student Program Open Study/Research Award** – Israel Fulbright Association  
(Funded self-directed research in a foreign country, top 10% of applications)
- 2022 1st Place, UTHealth Neuroscience Program Retreat Data Poster Competition - MD Anderson UTHealth GSBS
- 2022 Merit Award, SRBR Annual 2022 Conference – Society for Research in Biological Rhythms
- 2021 Dee S. and Patricia Osborne Endowed Scholarship in the Neurosciences** - Neuroscience Research Symposium
- 2021 John J Kopchick Research Award 2021** - MD Anderson UTHealth GSBS  
(Awarded \$50,000 in research supplies, top 8% of applications)
- 2021 F31 Ruth L. Kirschstein Predoctoral Individual National Research Service Award** - NIDDK NIH  
(Provided stipend funding 2022-2024, top 25% of applications)
- 2021 2nd Place, UTHealth Neuroscience Research Center Brain Awareness Week Video Contest - Neuroscience Research Center
- 2021 2nd Place, McGovern Medical School Research Retreat 2021 Poster Competition - MD Anderson UTHealth GSBS
- 2020 Merit Award, SRBR Annual Conference 2020 - Society for Research in Biological Rhythms
- 2019 2<sup>nd</sup> Place, Healthcare Innovation Challenge – UT Houston
- 2017 Murchison Undergraduate Research Fellowship - Trinity University

#### LEADERSHIP AND TEACHING EXPERIENCES

- **Brown Postdoctoral Organization Academic co-Chair** 2024 - Present  
*Brown University, Providence RI*
- **Judge for Brown University 2024 Summer Undergraduate Research Projects** March 2025  
*Brown University, Providence RI*
- **Panelist for Brown University 2024 Postdoctoral Recruitment Event** March 2025  
*Brown University, Providence RI*
- **Guest Lecturer for the Big Data Neuroscience Lab** October 2024  
*Brown University, Providence RI*
- **Neuroscience Graduate Student Peer Mentor** 2020-2023  
*MD Anderson UTHealth GSBS*
- **Neuroscience Student Journal Club Organizer** 2019-2022  
*MD Anderson UTHealth GSBS*
- **Neuroscience and Genetics & Epigenetics Art Fair Organizer** February 2022  
*MD Anderson UTHealth GSBS*
- **Neuroscience Program Student Council Officer** 2019-2021  
*MD Anderson UTHealth GSBS*
- **Healthcare Innovation Challenge Advisory Council** 2021  
*UT Health*
- **HIC Executive Committee Member** 2020  
*UT Health*
- **Neuroanatomy Teaching Assistant** Fall 2019  
*UT Health School of Dentistry*

#### SKILLS & TECHNIQUES

**Wet Lab:** Immunohistochemistry, Western blots, ELISA, Chromatin immunoprecipitation, Stereotaxic surgery, Circadian & Metabolic cage recording, Confocal imaging, Cheek bleeds, Cell tissue culture, Serum shock, Mouse breeding, Tissue sectioning on vibratome, cryostat and microtome, Flow assisted cell sorting, Genotyping, Nuclei isolation, RT-qPCRs, EEG implantation (mouse)

**Coding:** R studio, Python

**Programs:** GraphPad, BioRender, ActiView, Adobe Illustrator, Word, Excel, PowerPoint

**Analysis:** RNA sequencing, Biostatistics (i.e. t-tests, ANOVA, ect.), Single cell RNA sequencing, Chromatin immunoprecipitation sequencing, Circadian & Metabolic cage analysis

**Languages:** English, Spanish (elementary proficiency)