

# Rahul P. Patel

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## EDUCATION

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2018-Present	University of North Carolina-Chapel Hill	PhD	Neuroscience
2013-2017	Rutgers University	B.A.	Cell Biology and Neuroscience Psychology Minor

## SELECTED RESEARCH EXPERIENCE

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2018-Current	Graduate Student, School of Medicine, University of North Carolina-Chapel Hill Thesis Advisor: Dr. Mark Zylka Thesis: <i>Developing scalable engineering and computational systems to evaluate the affective component of pain in rodents for genetic, pharmacological, and behavioral studies</i>
2015-2018	Dr. Eric Hargreaves, Division of Neurosurgery, Rutgers-RWJMS <i>Regression Modeling of Deep Brain Stimulation Device Longevity</i>
2014-2018	Dr. Federico Sesti, Department of Neuroscience and Cell Biology, Rutgers-RWJMS <i>-Modulation of Cytoskeletal Dynamics under Conditions of Cellular Stress</i> <i>-Development of a High-Throughput C.elegans Assay Designed to Expedite Drug Discovery</i>
2014-2014	Dr. Jianmin Chen, Department of Cell Biology and Neuroscience, Rutgers University <i>Role of Ataxia-telangiectasia Mutated in the Pathology of Alzheimer's Disease</i>
2014-2014	Dr. Tracey Shors, Department of Psychology, Rutgers University <i>Stress of Sexual Aggression and its Effects on Neurogenesis and Learning</i>

## PUBLICATIONS

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McCoy ES\*, Park SK\*, **Patel RP\***, Ryan DF, Mullen ZJ, Nesbitt JJ, Lopez JJ, Taylor-Blake B, Krantz JL, Hu W, Garris RL, Lima LV, Sotocinal SG, Austin JS, Kashlan AD, Jimenez JA, Shah S, Trocinski AK, Vanden KA, Major RM, Bazick HO, Klein MR, Mogil JS, Wu G, Zylka MJ. (2022) Development and validation of PainFace, a software platform that simplifies and standardizes mouse grimace analyses. [bioRxiv](https://doi.org/10.1101/2022.03.15.481111). **\*contributed equally to this work**

Chen CH\*, **Patel R\***, Bortolami A, Sesti F. (2020). A novel assay for drug screening that utilizes the heat shock response of *Caenorhabditis elegans* nematodes. PLOS ONE 15(10): e0240255. **\*contributed equally to this work**

**Patel R**, Sriramoji S, Marucci M, Ibrahim A, Shah S, Sesti F. (2017). Cytoskeletal Remodeling via Rho GTPases during Oxidative and Thermal Stress in *Caenorhabditis elegans*. *Biochemical and Biophysical Research Communications*, 492: 338-342. PMID: 28859988.

**Patel R** and Sesti F. (2016). Oxidation of ion channels in the aging nervous system. *Brain Research*, 1639: 174-85. PMID: 26947620.

## PATENTS

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US Patent App. 16/468,239

Federico Sesti and **Rahul Patel**

"Screening for Agents that Target the Actin Cytoskeleton Using Recombinant *C. elegans* Expressing Human Genes"

## GRANTS & FELLOWSHIPS

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2021	UNC-CH	Collaborative Cross Pilot Program(\$8,544)( <b>Co-I</b> )
2020-2023	National Science Foundation	Graduate Research Fellowship (\$138,000)( <b>Recipient</b> )
2019	NINDS	Neuroscience Predoctoral Training Grant ( <b>Trainee</b> )
2018	National Science Foundation	PFI-Tech Transfer (\$200,000) ( <b>Consultant</b> , PI: Sesti)

2017	National Science Foundation	Innovation Corps Award (\$50,000) (EL, PI: Sesti)
2017	Rutgers University	Aresty Undergraduate Research Fellowship (\$900)
2016	Rutgers University	Aresty Undergraduate Research Fellowship (\$1,000)

## PROFESSIONAL HONORS, AWARDS, & RECOGNITIONS

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2014	Rutgers University	Aresty Research Center Research Assistant Stipend Award (\$1,000)
2015	Rutgers University	Interdisciplinary Boot Camp in Quantitative Biology Scholar
2015	Rutgers University	Aresty Research Center Conference Travel Award (for the Society for Neuroscience 45 <sup>th</sup> Annual Meeting) (\$400)
2016	Rutgers University	Aresty Research Center Conference Travel Award (for the Society for Neuroscience 46 <sup>th</sup> Annual Meeting) (\$500)
2016	Mt. Sinai School of Medicine	Undergraduate Research Symposium in Biological, Chemical, Structural, and Computational Sciences 1 <sup>st</sup> Place Poster Award (\$100)
2016	Society for Neuroscience	Early Career Policy Ambassadorship Program
2017	F.U.N	Faculty for Undergraduate Neuroscience (F.U.N) Travel award for SfN 2017 (\$750)
2018	NSF	Honorable Mention for NSF GRFP
2019	NIH	Scholarship to attend The Whole Scientist Workshop (\$500)
2019	The Jackson Laboratory	Travel Award to attend The Whole Scientist Workshop (\$500)
2019	UNC-NCSU BME Dep.	1 <sup>st</sup> Place Poster Presentation at 2019 Departmental Retreat (\$50)
2019	UNC CBPH /NBIO	Most Improved Presentation
2020	UNC School of Medicine	Single-cell RNAseq data analysis workshop attendee
2022	NIH	Scholarship to attend Jax Short Course on Applications of Machine Learning for Automated Quantification of Behavior (\$500)

## TEACHING

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2014-2016	Rutgers University	Douglass Writing Center Tutor
2015-2017	Rutgers University	PSY340: Abnormal Psychology (Undergraduate TA)
2020-2022	UNC-Chapel Hill	NCSI 222: Learning (Guest Lecturer)
2022-Present	UNC-Chapel Hill	NBIO 722: Cell. and Mol. Neurobiology (Guest Lecturer)

## INDUSTRY COLLABORATIONS

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2017-2020	Eli Lilly and Company	<b>Rahul Patel</b> and Federico Sesti Validation of <i>C.elegans</i> based Drug Discovery Platform
2018-2020	Merck and Company	<b>Rahul Patel</b> and Federico Sesti Automation of a <i>C.elegans</i> based Drug Discovery Platform

## SELECTED ORAL PRESENTATIONS

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1. **Rahul Patel**. "Facial Grimaces as a Proxy of Pain and Analgesia". Seminar Hosted by Dr. Bradley Zuchero. Stanford University, Department of Neurosurgery, Stanford, California. October 28<sup>th</sup>, 2022.
2. **Rahul Patel**. "Automated Evaluation of Pain Affect". Selected Short Talk. Keystone Vertebrate Sensory Systems Meeting, Lake Tahoe, California. October 26<sup>th</sup>, 2022.
3. **Rahul Patel**. "Automated Analysis of Spontaneous Pain". Merck Bioanalysis Forum Flash Talk. UNC-Chapel Hill. October 20<sup>th</sup>, 2022.
4. **Rahul Patel**. "Spontaneous Pain: Pharmacological and Genetic Influences". UNC Neuroscience Center 2022 Spring Seminar Series. UNC-Chapel Hill. January 27<sup>th</sup>, 2022.
5. **Rahul Patel**. "Development of a Scalable Data Acquisition System to Evaluate Affective Pain in Mice". Merck Emerging Talent Symposium. Virtual. November 4<sup>th</sup>, 2021.

6. **Rahul Patel.** "Development of Scalable Data Acquisition System to Evaluate Spontaneous Pain in Mice". UNC Neuroscience Center Seminar Series. April 8<sup>th</sup>, 2021.
7. **Rahul Patel.** "Heat shock as a Novel Paradigm for Drug Discovery". Amedeo Avogadro University of Eastern Piedmont, Department of Health Sciences. Novara, Italy. July 27<sup>th</sup>, 2018.
8. **Rahul Patel.** Deep brain stimulation battery longevity of Medtronic Activa PC neurostimulators; parameter contribution using linear regression models. 47<sup>th</sup> Annual Meeting of the Society for Neuroscience. Washington, DC. November 12<sup>th</sup>, 2017
9. **Rahul Patel.** "Actin Remodeling during Oxidative and Thermal Stress". Aresty Research Colloquium. Rutgers University, New Brunswick, NJ. May 3<sup>rd</sup>, 2017
10. **Rahul Patel.** "Elucidating the role of the actin cytoskeleton in the thermal stress response of cells". Aresty Research Colloquium. Rutgers University, New Brunswick, NJ. May 4<sup>th</sup>, 2016
11. **Rahul Patel.** "Modulation of Rho GTPases Activity During Aging and Thermal Insult". Rutgers Worm Super-Group Meeting. Nelson Biology Laboratories, Piscataway Township, NJ. February 24<sup>th</sup>, 2016
12. **Rahul Patel.** "DBS Battery Decay of Activa PC Neurostimulators; Initial Clinical Data". 2<sup>nd</sup> Annual Delaware Valley Regional Movement Disorder Meeting. City Tavern, Philadelphia, PA. December 3<sup>rd</sup>, 2015
13. **Rahul Patel.** "Genetic intervention on Rho signaling ameliorates the toxic effects of A $\beta$ 42 in *Caenorhabditis elegans* neurons". Aresty Research Colloquium. Rutgers University, New Brunswick, NJ. May 1<sup>st</sup>, 2015

## SELECTED ABSTRACTS AND POSTER PRESENTATIONS

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1. **Patel RP\***, McCoy ES\*, Park SK\*, Ryan DF, Mullen ZJ, Nesbitt JJ, Lopez JJ, Taylor-Blake B, Krantz JL, Hu W, Garris RL, Lima LV, Sotocinal SG, Austin JS, Kashlan AD, Jimenez JA, Shah S, Trocinski AK, Vanden KA, Major RM, Bazick HO, Klein MR, Mogil JS, Wu G, Zylka MJ. Development and validation of PainFace, a software platform that simplifies and standardizes mouse grimace analyses. Keystone Vertebrate Sensory Systems Meeting. Lake Tahoe, California. October 26<sup>th</sup>, 2022.
2. **Patel RP\***, McCoy ES\*, Park SK\*, Ryan DF, Mullen ZJ, Nesbitt JJ, Lopez JJ, Taylor-Blake B, Krantz JL, Hu W, Garris RL, Lima LV, Sotocinal SG, Austin JS, Kashlan AD, Jimenez JA, Shah S, Trocinski AK, Vanden KA, Major RM, Bazick HO, Klein MR, Mogil JS, Wu G, Zylka MJ. Development and validation of PainFace, a software platform that simplifies and standardizes mouse grimace analyses. Merck Bioanalysis Forum. UNC-CH, Chapel Hill, North Carolina. October 20<sup>th</sup>, 2022.
3. **Patel RP\***, McCoy ES\*, Park SK\*, Ryan DF, Mullen ZJ, Nesbitt JJ, Lopez JJ, Taylor-Blake B, Krantz JL, Hu W, Garris RL, Lima LV, Sotocinal SG, Austin JS, Kashlan AD, Jimenez JA, Shah S, Trocinski AK, Vanden KA, Major RM, Bazick HO, Klein MR, Mogil JS, Wu G, Zylka MJ. Development and validation of PainFace, a software platform that simplifies and standardizes mouse grimace analyses. Jax Short Course on Applications of Machine Learning for Automated Quantification of Behavior. Jackson Laboratories, Bar Harbor, Maine. October 9<sup>th</sup>, 2022.
4. **Patel RP\***, McCoy ES\*, Park SK\*, Ryan DF, Mullen ZJ, Nesbitt JJ, Lopez JJ, Taylor-Blake B, Krantz JL, Hu W, Garris RL, Lima LV, Sotocinal SG, Austin JS, Kashlan AD, Jimenez JA, Shah S, Trocinski AK, Vanden KA, Major RM, Bazick HO, Klein MR, Mogil JS, Wu G, Zylka MJ. Development and validation of PainFace, a software platform that simplifies and standardizes mouse grimace analyses. Andrew S. Rachlin Neuroscience Symposium: The Neuroscience of Pain and Opioids. UNC-CH, Chapel Hill, North Carolina. October 6<sup>th</sup>, 2022.
5. **Rahul Patel**, Bei Liu, Joline Tung, Orrin Stone, and Klaus Hahn. Probe and Control Protein Activities During Phagocytosis. 2018 BBSP and PREP Poster Session. Chapel Hill, NC; November 12<sup>th</sup>, 2018.
6. Federico Sesti and **Rahul Patel**. Cytoskeletal remodeling via Rho GTPases during oxidative and thermal stress. 62<sup>nd</sup> Annual Meeting of the Biophysical Society. San Francisco, California; February 18-21, 2018.
7. **RP. Patel**, RJ DiPaola, DP. Schneider, S. Wong, SF. Danish, and EL. Hargreaves. Deep brain stimulation battery longevity of Medtronic activa pc neurostimulators; parameter contribution using linear regression models. 47<sup>th</sup> Annual Meeting of the Society for Neuroscience. Washington, DC; November 11-15<sup>th</sup>, 2017.
8. EL. Hargreaves, **RP. Patel**, RJ. Dipaola, S.Wong, DL. Caputo, and SF, Danish. Deep Brain Stimulation (DBS) battery longevity of Medtronic Activa SC is briefer than preceding Soletra models, a within subject analysis. The International Parkinson and Movement Disorder Society (MDS). Vancouver, BC; June 4-8<sup>th</sup>

9. **Patel R**, Duffy J, and Sesti F. High-Throughput Pharmacology: *C.elegans* for target specific and phenotypic screening. 12<sup>th</sup> Annual Conference of Protein Kinases in Drug Discovery. San Diego, CA; February 8-9<sup>th</sup>, 2017.
10. Hargreaves EL, **Patel RP**, DiPaola RJ, and Danish SF. Battery longevity of Medtronic Activa family of neuromodulation devices: nonlinear regression of clinical battery decay curves and supplemental end of service thresholds. 46<sup>th</sup> Annual Meeting of the Society for Neuroscience. San Diego, CA; November 12-16<sup>th</sup>, 2016
11. **Patel RP**, DiPaola RJ, Danish SF, Wong S, and Hargreaves EL. Deep brain stimulation Activa SC neurostimulator battery longevity: Initial clinical data. 46<sup>th</sup> Annual Meeting of the Society for Neuroscience. San Diego, CA; November 12-16<sup>th</sup>, 2016.
12. **Patel R**, Sriramoji S, and Sesti F. Oxidative Stress Susceptible Guanine Nucleotide Exchange Factor 1 (OSG-1) mediated thermotolerance in the heat shock response of *C.elegans*. Undergraduate Research Symposium in Biological, Chemical, Structural, and Computational Sciences. Ichan School of Medicine, Mount Sinai; New York City, NY; September 17<sup>th</sup>, 2016.
13. **Patel RP**, Scurato NM, and Sesti F. Oxidative Stress Susceptible Guanine Nucleotide Exchange Factor 1 (OSG-1) mediated thermotolerance in the heat shock response of *C.elegans*. 10<sup>th</sup> Annual William Paterson University Research Symposium. Wayne, NJ. April 9<sup>th</sup>, 2016.
14. Hargreaves EL, **Patel RP**, Wong S, DiPaola RJ, Mammis A, and Danish SF. Battery Longevity of Activa PC: Initial Clinical Data and Nonlinear Regression of Battery Decay Curves. 19<sup>th</sup> Annual Meeting of the North American Neuromodulation Society. Las Vegas, NV; December 10-13<sup>th</sup>, 2015.
15. **Patel R**, Marucci M, Patel D, and Sesti F. Rho signaling is implicated in the heat shock response of *C. elegans*. 1<sup>st</sup> Annual Brain Health Institute Symposium. Jersey City, NJ. October 26<sup>th</sup>, 2015.
16. **Patel R**, Duan Z, and Sesti F. Guanine nucleotide exchange factor OSG-1 confers functional aging via dysregulated Rho signaling in *Caenorhabditis elegans* neurons. 45<sup>th</sup> Annual Meeting of the Society for Neuroscience. Chicago, IL; October 17-21, 2015.
17. **Patel R**, DiPaola RJ, Danish SF, Wong S and Hargreaves EL. Deep brain stimulation battery decay of Activa PC neurostimulators; initial clinical data. 45<sup>th</sup> Annual Meeting of the Society for Neuroscience. Chicago, IL; October 17-21, 2015.

## ENTREPRENEURIAL VENTURES

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2021-Present                      [Hypothesis to Hardware, LLC](#) (CEO and Founder)

## SOCIETY MEMBERSHIPS

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2015-2021	Society for Neuroscience
2017-2021	Society for Laboratory Automation and Screening
2021-2022	International Association for the Study of Pain

## LEADERSHIP & SERVICE

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2014-2017	Peer Reviewer, IMPULSE - The Premier Undergraduate Neuroscience Journal
2014-2015	Global Health Chair, American Medical Student Association
2014-2015	Treasurer, Reach Out and Read
2014-2016	Founder and President, Knights Against Neurological Diseases and Disorders
2015	Panelist, Rutgers Writing Program: "Successful Science & Technical Writing, Effective Research, and Winning Grant Proposals"
2016	2016 Hill Day Participant, Society for Neuroscience
2016-2016	Public Education Intern, Society for Neuroscience
2016	Poster Presenter, Society for Neuroscience 46 <sup>th</sup> Annual Meeting Advocacy Reception
2016-2017	Undergraduate Representative, New Jersey Society for Neuroscience Chapter

2017	2017 Hill Day Participant, Society for Neuroscience
2017	Panelist, Rutgers iJobs Initiative (NIH Broadening Experiences in Scientific Training (BEST), Science Policy Careers Panel
2018-2021	Advocacy Committee Member, Society for Laboratory Automation and Screening
2019	Carolina Neurostimulation Conference Planning Committee Member (Data Analysis)
2019-2022	Student Selected Speaker Committee Member, Neuroscience Curriculum, UNC-CH
2020-Present	Reviewer, NSF GRFP Peer Reviewer, UNC-CH
2020	Speaker, United States Graduate School Admissions Process, <a href="#">ScienceBeyondBooks</a>
2021	Committee member, Provost search committee (by invitation from Chancellor Guskiewicz), UNC-CH
2022-Present	Committee member, Neuroscience Center Social Committee, UNC-CH

## SCIENCE WRITING AND COMMUNICATION

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- Rahul Patel.** [Why Our Undergraduate Perspectives Matter in Advocacy](#). Neuronline. November 29<sup>th</sup>, 2016.
- Rahul Patel.** [Image of the Week: Look Inside the Dentate Gyrus](#). Brainfacts.org. July 8<sup>th</sup>, 2016.
- Rahul Patel.** [Image of the Week: Signaling Across Brain Regions](#). Brainfacts.org. July 25<sup>th</sup>, 2016.
- Rahul Patel.** [Image of the Week: The Brain's Stop Signs](#). Brainfacts.org. August 19<sup>th</sup>, 2016.
- Rahul Patel.** [Image of the Week: The Cells Behind Movement and Coordination](#). Brainfacts.org. September 9<sup>th</sup>, 2016.
- Rahul Patel.** Scientific Advocacy: Initiating Conversation with Local Policymakers. Neuronline. January 12<sup>th</sup>, 2017.
- Rahul Patel.** The Effects of Federal Funding on the Undergraduate Research Experience. The Examiner-Rutgers' Pre-Health Journal. April 25<sup>th</sup>, 2017.
- Rahul Patel.** The Benefits of Taking a Gap Year before Grad School. Neuronline. August 29<sup>th</sup>, 2018.
- Rahul Patel.** How to Prepare for Your Grad School Interview Weekend. Neuronline. December 21<sup>st</sup>, 2018.
- Rahul Patel.** Questions to Answer Before You Choose a Grad Program. Neuronline. February 19<sup>th</sup>, 2019.
- Rahul Patel** and Rachel Gilfarb(host). [Measuring Spontaneous Pain](#). Why the F\*\*\* should we care? April 4<sup>th</sup>, 2021

## SELECTED MENTORING

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### **Current:**

**University of North Carolina-Chapel Hill:** Rohan Ray (02/2021-Current, 1<sup>st</sup> year Neuroscience and Computer Science major, 2021 Lenovo Machine Learning Intern, 2022 Microsoft Computational Biology Intern), Maggie Snyder (07/2021-Current, 4<sup>th</sup> year Biomedical Engineering major, BME Honor's Thesis Student, **Current:** Research Technician Zylka Lab).

### **Previous:**

**University of North Carolina-Chapel Hill:** Catherine Bennet (05/2019-12/2019, 4<sup>th</sup> year Biomedical Engineering Major, 2019 UNC Office of Undergraduate Research Travel Awardee (\$300), 2019 UNC/NCSU Departmental Retreat 3<sup>rd</sup> place best Poster Design Winner), Gabrielle Labrozzi (05/2019-07/2020, 4<sup>th</sup> Year Biomedical Engineering Major, Honors Thesis Student, 2019 UNC/NCSU Departmental Retreat 3<sup>rd</sup> place best Poster Design Winner, 2019 UNC/NCSU Abram's Scholar (\$2,500 Fellowship), **Current:** PhD Student at Case Western Reserve University in the Biomedical Engineering PhD Program), Ramya Kolagani (08/2019-07/2020, 3<sup>rd</sup> year Neuroscience Major, Honors College, 2020 Merck and Co. Intern, **Current:** PharmD student at University of Illinois at Chicago), Miles Lee (02/20-07/2020, 2<sup>nd</sup> year Biomedical Engineering Major, **Current:** Consultant at Bain and Company), Ross Rucho (05/2019-08/2019, 4<sup>th</sup> year Biomedical Engineering and Computer Science Double Major), Nicholas Ringelberg (06/2019-07/2019, B.A., Rotation MD/PhD student), Tracy Ann Boodhoo (03/2021-10/2021, 4<sup>th</sup> year Computer Science major, **Current:** Data Scientist), Morgan Klein (09/21-08/22, 3<sup>rd</sup> year Neuroscience major, 2022 NIDA Intern (Mentor: Dr. Beth Darnall, Stanford University, co-author on McCoy\*, Park\*, Patel\* et al., 2022, bioRxiv).

**North Carolina State University:** Joseph Turner (05/2019-08/2019, Summer of Learning and Research (SOLAR) student, 3<sup>rd</sup> place best elevator pitch talk in SOLAR program, 1<sup>st</sup> year Biomedical Engineering Major).

**Rutgers:** Michael Munafo (2017-2018, B.A., Cell Biology and Neuroscience Major and Aresty Undergraduate Research Fellow, **Current:** Medical Student), Ge Bai (2018-2018, 3<sup>rd</sup> Year Cell Biology and Neuroscience Major and Aresty Undergraduate Research Fellow), Uma Komatreddy (2018-2018, 3<sup>rd</sup> Year Cell Biology and Neuroscience Major and Aresty Undergraduate Research Fellow, **Current:** Medical Student ), and Mathujan Yogarajah (2018-2018, 2<sup>nd</sup> Year Cell Biology and Neuroscience Major)

**The College of New Jersey:** Aziz Ibrahim (2016-2018, 2<sup>nd</sup> year student in Biology and Political Science, Contributing author on Patel et al., 2017)