

Jesse Nicholas (Nick) Cochran, Ph.D.

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Education

- 2005 – 2010 **Bachelor of Chem. Engineering**, biomedical specialization, *cum laude*
Auburn University (Auburn, AL)
Senior honors thesis: *Cloning Feline β -Hexosaminidase for Treatment of a Neurologic Disease*
- 2010 – 2015 **Ph.D. in Neurobiology and HHMI Med-Grad Scholar**
University of Alabama at Birmingham (Birmingham, AL)
Thesis: *Tau-SH3 Interactions: Implications for Alzheimer's Disease*

Research & Work Experience

- 2007 – 2008 **Project Eng. Co-op**, SABIC Innovative Plastics (Montgomery, AL)
Managed chemical plant engineering projects over 3 semesters.
- 2009 – 2010 **Undergrad. Res. Assistant**, Scott-Ritchey Research Center (Auburn, AL)
Cloned two feline genes for insertion into AAV vectors to treat lysosomal storage diseases in cats as a model for eventual human therapies. (PI: Dr. Douglas Martin)
- 2010 – 2015 **Graduate Student**, Center for Neurodegen. and Exp. Therapeutics (UAB)
Spearheaded a translational research project for Alzheimer's disease including a drug screen in collaboration with Southern Research Institute. Mechanistically investigated the endogenous role of two late-onset AD risk gene candidates, *BIN1* and *CD2AP*, using animal models. (PI: Dr. Erik Roberson)
- 2015 – Present **Postdoctoral Fellow**, HudsonAlpha (Huntsville, AL)
I am currently focused on the genomics of neurodegenerative diseases. I (1) lead and participate in projects to discover new genetic associations with neurodegenerative diseases and related phenotypes and (2) functionally assess regulation of key neurodegeneration-associated genes. (PI: Dr. Richard Myers)

Awards & Honors

2005 – 2010	Full Academic Scholarship, Auburn University
2005	College of Science and Mathematics departmental scholarship
2006	Junior Honors Program, Auburn University
2008	Chemical Engineering departmental scholarship
2008 – 2009	3 semesters on Dean's List
2010	2 nd place, Sigma Xi best overall science or engineering poster
2012	1 st place, UAB Neurodegeneration Retreat poster session
2014	Awarded 1 of 5 Alzheimer's Drug Discovery Foundation Outstanding Young Investigator Scholarships for the 8 th Annual Drug Discovery for Neurodegeneration Conference
2014	1 st place, Comprehensive Center for Healthy Aging poster session
2015	The UAB Outstanding Graduate Student in Neuroscience
2020	Won travel scholarship to attend the Alzheimer's Association International Conference based on a platform presentation at the Tau 2020 Conference

Teaching & Service

2007, 2008, 2009	South's BEST Junior High and High School Robotics Competition judge
2009 – 2010	President of American Institute of Chemical Engineers, Auburn chapter
2011 – 2014	Mentor for Pauleatha Diggs, undergraduate in UAB Neuroscience
2012, 2013	UAB Neuroscience Theme Admissions Committee
2012 – 2014	Point person for 5 rotation students, with projects stemming from mine
2013	Teaching assistant for Mechanism of Memory course
2014	Summer mentor for Kelly Chen, a local high school student
2015, 2016	Biotech & Genomics Lecture for UAH BYS 219: Genetics and Evolution
10/16	2 Alzheimer's public outreach seminars
10/16, 02/19	Oakwood University guest lecture: "Neurologic Disease Research in Alabama: From Discovery to Therapy"
12/16	Alzheimer's Q&A with <i>Inside Medicine</i> , Winter 2016 issue
12/16	Alzheimer's public outreach seminar
02/17	Scottsboro high school 11/12 advanced science and math field trip talk: "Neurologic Disease Research in Alabama: From Discovery to Therapy"
02/17	HA Outreach talk: "Alzheimer's Disease Overview"
06,07/17	Mentor for Dan Nguyen and Drew Bonner (HudsonAlpha BioTrain interns)

06/17; 06/18	High school talk: "Neurologic Disease Research in Alabama: From Discovery to Therapy"
08/17 – 07/19	Mentor for Natalie Davis (undergraduate researcher from UAH, now PhD trainee at UAB)
06,08,10/17; 06/18	HA Outreach talk (x7): "Finding New Causes and Markers of Alzheimer's with Genomics"
06,07/18	Summer mentor for Capri Alex (STEP-UP) and Bri Brazell (UAB rotation)
08/18	UAH event: "Genomics of Alzheimer's Disease"
08/18	Montgomery, AL caregivers event: "The Latest Research in the Alzheimer's Field"
10/18	Birmingham, AL caregivers event: "Newly Identified Genetic Risk Factors for Early Onset Dementia"
02/19	Talk for UAB neuroscience program recruitment: "Successes from Collaborative Neurologic Disease Research in Alabama"
06,07/19	Summer mentor for Joelle Kim (HudsonAlpha BioTrain intern)
06/19, 07/19	HA Outreach talk (x2) (for two different high school educator groups) "Findings from Recent Neurodegeneration Research at HudsonAlpha"
07/19	HA Outreach talk for local high school students: "Neurologic Disease Research in Alabama: From Discovery to Therapy"
09/19	HA Outreach talk: "Findings from Recent Neurodegeneration Research at HudsonAlpha"
10/20	HA Outreach talk: "The Latest Research in the Alzheimer's Field"

Ad Hoc Reviewer:

Alzheimer's & Dementia, Brain Research, European Heart Journal, Genome Research, Human Molecular Genetics, PLoS Genetics

Guest Editor:

PLoS Genetics

Conference Session Chair:

Alzheimer's Association Neuroscience Next: Tau Lightning Round

Memberships

- American Institute of Chemical Engineers
- TBP Engineering Honor Society
- ΦΛΥ National Honorary Chemical Society
- Society for Neuroscience
- Alzheimer's Association International Society to Advance Alzheimer's Research and Treatment
- American Society of Human Genetics

Funding

Current

- K99/R00: "Regulatory mechanisms of rare non-coding variation in neurodegeneration-associated loci" (1K99AG068271-01) (2020 – 2023)
- BrightFocus foundation fellowship: "Mechanisms of *MAPT* Regulation" (2019 – 2021)

Previous

- Awarded UAB-HudsonAlpha T32 in Genomic Medicine (2016)
- UAB Neurobiology of Cognition and Cognitive Disorders T32 (2012 – 2014)
- Howard Hughes Med-Grad Fellowship. Funded one year and provided courses in translational research throughout graduate training. (2010 – 2011)

Publications

1. Seward, M. E., Swanson, E., Norambuena, A., Reimann, A., **Cochran, J. N.**, Li, R., Roberson, E. D., and Bloom, G. S. (2013) Amyloid-beta signals through tau to drive ectopic neuronal cell cycle re-entry in Alzheimer's disease. *Journal of Cell Science*. 126, 1278–1286. January 2013.
2. Bradbury, A. M., **Cochran, J. N.**, McCurdy, V. J., Johnson, A. K., Brunson, B. L., Gray-Edwards, H., Leroy, S. G., Hwang, M., Randle, A. N., Jackson, L. S., Morrison, N. E., Baek, R. C., Seyfried, T. N., Cheng, S. H., Cox, N. R., Baker, H. J., Cachon-Gonzalez, M. B., Cox, T. M., Sena-Esteves, M., and Martin, D. R. Therapeutic Response in Feline Sandhoff Disease Despite Immunity to Intracranial Gene Therapy. *Molecular Therapy*. 21 (7), 1306-1315. May 2013.

3. **Cochran, J.N.**, Hall, A.M., and Roberson, E.D. Dendrites in the Pathophysiology of Alzheimer's Disease. *Brain Research Bulletin*. 103, 18–28. December 2013. (Review)
4. **Cochran, J.N.**, Diggs P.V., Nebane M., Rasmussen L., White L., Maddry J., Suto M., and Roberson, E. D. AlphaScreen® HTS and Live Cell Bioluminescence Resonance Energy Transfer (BRET) Assays for Identification of Tau–Fyn SH3 Interaction Inhibitors for Alzheimer's Disease. *Journal of Biomolecular Screening*. 19, 1338–1349. December 2014.
5. **Cochran, J.N.**, Rush T., Buckingham S.C., Roberson, E.D. The Alzheimer's disease risk factor CD2AP maintains blood-brain barrier integrity. *Human Molecular Genetics*. 24(23), 6667–6674. September 2015.
6. Love, M.N, Clark, D.G., **Cochran, J.N.**, Den Beste, K.A., Gelmacher, D.S., Bateman, R.J., Roberson, E.D. A novel Presenilin 1 Mutation (N135Y) causing Alzheimer's disease. *Neurobiology of Aging*. 49, 216.e7–216.e13. January 2017.
7. Bowling, K.M., Amaral, M.D., Finnila, C.R., Hiatt, S.M., Thompson, M.L., Engel, K.L., **Cochran, J.N.**, Brothers, K.B., East, K.M., Gray, D.E., Kelley, W.V., Lamb, N.E., Lose, E.J., Rich, C.A., Simmons, S., Whittle, J.S., Weaver, B., Myers, R.M., Barsh, G.S., Bebin, E.M., Cooper, G.M. Genomic diagnosis for children with intellectual disability and/or developmental delay. *Genomic Medicine*. 9:43. May 2017.
8. Hiatt S.M., Amaral M.D., Bowling K.M., Finnila C.R., Thompson M.L., Gray D.E., Lawlor J.M.J., **Cochran J.N.**, Bebin E.M., Brothers K.B., East K.M., Kelley W.V., Lamb N.E., Levy S.E., Lose E.J., Neu M.B., Rich C.A., Simmons S., Myers R.M., Barsh G.S., Cooper G.M. Systematic reanalysis of genomic data improves quality of variant interpretation. *Clinical Genetics*. 94, 174–178. April 2018.
9. Snijders Blok L., Hiatt S.M., Bowling K.M., Prokop J.W., Engel K.L., **Cochran J.N.**, Bebin E.M., Bijlsma E.K., Ruivenkamp C.A.L., Terhal P., Simon M.E.H., Smith R., Hurst J.A.; DDD study, McLaughlin H., Person R., Crunk A., Wangler M.F., Streff H., Symonds J.D., Zuberi S.M., Elliott K.S., Sanders V.R., Masunga A., Hopkin R.J., Dubbs H.A., Ortiz-Gonzalez X.R., Pfundt R., Brunner H.G., Fisher S.E., Kleefstra T., Cooper G.M. De novo mutations in MED13, a component of the Mediator complex, are associated with a novel neurodevelopmental disorder. *Human Genetics*. 137, 375–388. May 2018.

10. Carvill, G.L., Engel, K.L., Ramamurthy, A., **Cochran, J.N.**, Barsh, G.S., Roovers, J., Stamberger, H., Lim, N., Schneider, A., Hollingsworth, G., Reagan, B., Lagae, L., Ceulemans, B., Bebin, M., Nguyen, J., Weckhuysen, S., Meisler, M., Berkovic, S., de Jonghe, P., Scheffer, I.E., Myers, R.M., Cooper, G.M., Mefford, H.C. Aberrant inclusion of a poison exon causes dravet syndrome and related *SCN1A*-associated genetic epilepsies. *American Journal of Human Genetics*. 103, 1022–1029. December 2018.
11. Geier, E.G., Storm, N.J., Bourdenx, M., **Cochran, J.N.**, Sirkis, D.W., Hwang, J., Bonham, L.W., Ramos, E.M., Diaz, A., Van Berlo, V., Dokuru, D., Li, A.N., Karydas, A., Balestra, M.E., Huang, Y., Russo, S.P., Spina, S., Grinberg, L.T., Seeley, W.W., Myers, R.M., Miller, B.L., Coppola, G., Lee, S.E., Cuervo, A.M., Yokoyama, J.S. Rare variants in the neuronal ceroid lipofuscinosis gene *MFSD8* are risk factors for frontotemporal dementia. *Annals of Neurology*. 137 (1), 71–88. January 2019.
12. East, K. M., Cochran, M., Kelley, W.V., Greve V., Emmerson, K., Raines, G., **Cochran, J.N.**, Hott, A.M., Bick, D. Understanding the present and preparing for the future: exploring the needs of diagnostic and elective genomic medicine patients. *Journal of Genetic Counseling*. 28(2), 438–448. April 2019.
13. Aguilar, L.R., Acosta-Uribe, J., Giraldo, M.M., Moreno, S., Baena, A., Alzate, D., Cuastumal, R., Aguillón, D., Madrigal, L., Saldarriaga, A., Navarro, A., Garcia, G.P., Aguirre-Acevedo, D.C., Geier, E.G., **Cochran, J.N.**, Myers, R.M., Yokoyama, J.S., Kosik, K.S., Lopera, F. Genetic Origin of a Large Family with a Novel *PSEN1* Mutation (Ile416Thr). *Alzheimer's & Dementia*. 15(5), 709–719. May 2019.
14. Rush, T., Roth, J.R., Thompson, S.J., Aldaher, A.R., **Cochran, J.N.**, Roberson, E.D. Tau-SH3 interactions are critical for amyloid- β toxicity in primary neurons. *Neurobiology of Disease*. 5;134:104668. DOI: 10.1016/j.nbd.2019.104668. November 2019.
15. **Cochran, J.N.**, McKinley, E.C., Cochran, M., Amaral, M.D., Moyers, B.A., Lasseigne, B.N., Gray, D.E., Lawlor, M.J.M., Prokop, Geier, E.G., J.W., Holt, Thompson, M.L., J.M., Newberry, J.S., Yokoyama, J.S., Worthey, E.A., Geldmacher, D.S., Love, M.N., Cooper, G.M., Myers, R.M.*, Roberson, E.D.* (*equal contribution) Genome sequencing for early onset neurodegeneration: high diagnostic yield and frequent observation of multiple high impact alleles. *Molecular Case Studies*. 13;5(6):a003491. December 2019.

16. **Cochran, J.N.**, Geier, E.G., Newberry, J.S., Amaral, M.D., Thompson, M.L., Lasseigne, B.N., Bonham, L.W., Karydas, A.M., Roberson, E.D., Cooper, G.M., Rabinovici, G.D., Miller, B.L., Myers, R.M.*, Yokoyama, J.S.* (*equal contribution) Non-Coding and Loss-of-Function Coding Variants in *TET2* Are Associated with Multiple Neurodegenerative Diseases. *American Journal of Human Genetics*. 7;106(5):632–645. May 2020.

Cochran, J.N., Myers, R.M., Yokoyama, J.S., Response to Holstege et al. *American Journal of Human Genetics*. 107(3):577–578. September 2020. (related to 16.)

17. Voskobiynyk, Y., Roth, J. R., **Cochran, J. N.**, Rush, T., Carullo, N. V., Mesina, J. S., Waqas, M., Vollmer, R. M., Day, J. J., McMahon, L. L., & Roberson, E. D. Alzheimer's disease risk gene *BIN1* induces Tau-dependent network hyperexcitability. *eLife*, 9, e57354. DOI: 10.7554/eLife.57354. July 2020.

18. ***Co-1st** Graff, E.C.*, **Cochran, J.N.***, Kaelin, C.B., Day, K.R., Gray-Edwards, H.L., Watanabe, R., Koehler, J.W., Falgoust, R.A., Brunson, B.L., Prokop, J.W., Henegar, C., Morrison, N.E., Myers, R.M., Cox, N.R., Barsh, G.S., Martin, D.R. *PEA15* loss of function and defective cerebral development in the domestic cat. *PLoS Genetics* (DOI: 10.1371/journal.pgen.1008671). December 2020.

19. Voskobiynyk, Y., Battu, G., Felker, S., **Cochran, J.N.**, Newton, M.P., Lambert, L., Kesterson, R.A., Myers, R.M., Cooper, G.M., Roberson, E.D., Barsh, G.S. Aberrant regulation of a poison exon caused by a non-coding variant in *Scn1a*-associated epileptic encephalopathy. *PLoS Genetics* (DOI: 10.1371/journal.pgen.1009195). January 2021.

Manuscripts Submitted and/or Pre-Printed

20. ***Co-1st** **Cochran, J.N.***, Acosta-Uribe, J.*, Madrigal, L., Aguillón, D., Garcia, G.P., Giraldo, M.M., Acosta-Baena, N., Piedrahita, F., Alzate, D., Lopez, H.E., Roberts, K., Absher, D., Myers, R.M., Lopera, F.**, Kosik, K.S.** (**equal contribution) Genetic Associations with Age at Dementia Onset in the PSEN1 E280A Colombian Kindred. Under initial review at *Lancet Neurology* (also on medRxiv, doi: 10.1101/2020.09.23.20198424).

21. Readhead, B., Velazquez, R., Lu, A.T., Nolz, J., Shireby, G., Yokoyama, J.S., Lunnon, K., Horvath, S., Coleman, P.D., **Cochran, J.N.**, Mastroeni, D. PIN1 is an indicator of Female associated risk of Alzheimer's disease. Submitted to *Neurobiology of Aging*.

22. Ibanez, A., Yokoyama, J.S., Possin, K., Matallana, D., Lopera, F., Nitrini, R., Takada, L., Custodio, N., Sosa, A.L., Avila-Funes, A., Behrens, M.I., Slachevsky, A., Myers, R.M., **Cochran, J.N.**, Brusco, I., Bruno, M., Brucki, S., Pina, S.D., de Oliviera, M.O., Kehoe, P.D., Santamaria-Garcia, H., Moguilner, S., Garcia, A.M., Cardona, J.F., Duran, C., Tagliazucchi, E., Longoria, M., Pintado, M., Godoy, M.E., Bakman, V., Javandel, S., Kosik, K.S., Valcour, V., Miller, B.L. The Multi-Partner Consortium to Expand Dementia Research in Latin America (ReDLat): Driving multicentric research and implementation science. Submitted to *Frontiers in Neurology*.

NCBI My Bibliography: <http://www.ncbi.nlm.nih.gov/myncbi/browse/collection/47517585/>

Google Scholar: <https://scholar.google.com/citations?user=Sqk5j5wAAAAJ&hl=en>

Manuscripts in Preparation

23. *Co-1st Johnson, A.K.* , McCurdy, V.J.* , Gray-Edwards, H.L., Maguire, A.S., **Cochran, J.N.**, Gross, A.L., Skinner, H.E., Randle, A.N., Bradbury, A.M., Leroy, S.G., Hwang, M., Rockwell, H.E., Cox, N.R., Baker, H.J., Seyfried, T.N., Sena-Esteves, M., Martin, D.R. Long-term benefit of intracranial AAV gene therapy in feline Sandhoff disease.
24. Voskobiynek, Y., **Cochran, J.N.**, Roberson, E.D. Tau reduction in excitatory neurons is excitoprotective, while in inhibitory neurons is excitotoxic.
25. ***Co-1st** Voskobiynek, Y.* , **Cochran, J.N.***, Carullo, N.V.N., Cobos, I., Day, J.J., Bennett, D.A., Myers, R.M., Roberson, E.D. Loss of neuronal BIN1 isoform 1 present in Alzheimer's disease patients leads to seizure susceptibility in a mouse model of whole-brain BIN1 knock out.
26. ***Co-1st** Voskobiynek, Y.* , **Cochran, J.N.***, Roth, J., Waqas, M., Vollmer, R., McMahon, L.L., Roberson, E.D. BIN1 loss in inhibitory neurons drives seizure susceptibility.
27. *Co-1st Ogonowski, N.* , Santamaría-García, H.* , Baez, S.* , López, A.* , Laserna, A., García, E., Ayala, P., Zarante, I., Suarez, F. Reyes, P., Schulte, M., Santacruz-Escudero J.M., **Cochran, J.N.**, Sirkis, D.W., Yokoyama, J.S., Miller, B.L., Kosik, K., Matallana, D., Ibáñez, A. Behavioral variant frontotemporal dementia presentation in patients with heterozygous p.H157Y variant of *TREM2*.

28. *Co-1st Acosta-Uribe, J.*, Aguillón, D.F.*, Killingsworth, B.W., **Cochran, J.N.**, Madrigal, L., Giraldo, M.M., Labib, S., Ramirez, P., Garcia, G.P., Lopez, H.E., Coppola, G., Wojta, K., Myers, R.M., Lopera, F., Kosik, K.S. The Admixture and Neurodegeneration Genomic Landscape: Insights from a Colombian cohort.

Patent Applications

Erik D. Roberson and **J. Nicholas Cochran**. *Improved Bioluminescence Resonance Energy Transfer System and Method*. U.S. Provisional Patent Application 61/592,240.

Poster Presentations (regional or national meetings bolded)

Cloning Feline β -Hexosaminidase for Treatment of a Neurologic Disease (Martin Lab)

04/09 Auburn Undergraduate Research and Creative Scholarship Forum

04/10 **Regional American Institute of Chemical Engineers conference**

04/10 Auburn Undergraduate Research and Creative Scholarship Forum

(2nd place, Sigma Xi Best Overall Science or Engineering Poster)

Cell Based Assays of LRRK2 Inhibitors for Parkinson's Disease (West Lab)

2010 UAB Center for Clinical and Translational Science Symposium

Targeting the Tau-Fyn Interaction in Alzheimer's Disease (Roberson Lab)

02/12 UAB Neurodegeneration Retreat (won poster competition)

11/13 **Society for Neuroscience Annual Meeting**

02/14 **8th ADDF Annual Drug Discovery for Neurodegeneration Conference**

10/14 UAB Comprehensive Center for Healthy Aging (won poster competition)

11/14 **Society for Neuroscience Annual Meeting**

2011 – 2015 10 other UAB events

BIN1 Mediates Excitability Through Scaffolding of a Tau/VGCC/BK Complex (Roberson Lab)

2014 – 2015 2 UAB events

07/15 **Alzheimer's Association International Conference**

The Alzheimer's Disease Risk Factor CD2AP Maintains Blood–Brain Barrier Integrity

10/15 **Society for Neuroscience Meeting** (Erik Roberson Presented)

A pipeline for rapid in vitro evaluation of variants of uncertain significance from patients with developmental delay and/or intellectual disability exhibiting seizures (Myers Lab)

11/16 **Society for Neuroscience Meeting**

PEA15 deficiency is associated with striking neurologic and motor abnormalities in Felis catus (Myers Lab)

10/17 **American Society for Human Genetics**

Non-Coding and Loss-of-Function Coding Variants in TET2 Are Associated with Multiple Neurodegenerative Diseases (Myers Lab)

07/19 **Alzheimer's Association International Conference**

08/19 **Tau Consortium Investigators' Meeting**

Characterization of the gene regulatory network of HTT

10/19 **Society for Neuroscience Meeting**

Identification of MAPT neuronal cis-regulatory elements (Myers Lab)

02/20 Auburn CNSi Retreat 2020

Genetic Associations with Age at Dementia Onset in the PSEN1 E280A Colombian Kindred (Myers Lab)

11/20 **Neuroscience Next 2020**

Oral Presentations (regional or national meetings bolded):

Targeting the Tau-Fyn Interaction in Alzheimer's Disease (Roberson Lab)

2012 – 2013 4 UAB Events

Targeting Tau-SH3 Interactions in Alzheimer's Models (Roberson Lab)

2013 – 2014 2 UAB Events

BIN1 Mediates Excitability Through BK Channels (Roberson Lab)

01/15 UAB CNET Meeting

10/15 **Society for Neuroscience Meeting** (Erik Roberson Presented)

Application of Genomic Medicine Approaches to Neurologic Diseases: From Discovery to Mechanism (Myers Lab)

2017 2 HudsonAlpha Events

Rapid in vitro evaluation of genes of uncertain disease significance implicated in gene expression and seizures from patients with developmental delay and/or intellectual disability (Myers Lab)

04/17 **NHGRI Trainees Annual Meeting**

Whole Genome Sequencing for Families with Early-Onset Neurologic Diseases: A UAB-HudsonAlpha Collaboration (Myers Lab)

09/17, 10/17, 02/18 UAB and HudsonAlpha, 3 separate events

05/18 **CSER sites webcast meeting**

Findings from Whole Genome Sequencing for over 1000 Early-Onset AD and FTD Cases (Myers Lab)

09/18 **Southeastern Neurodegeneration Conference**

Identification of MAPT neuronal cis-regulatory elements (Myers Lab)

02/20 **Tau 2020**