CURRICULUM VITAE

Robert A. McDougal, PhD

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Contact Information:

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Education:

08/2000 - 05/2004	BS, University of Maryland Baltimore County, Mathematics with Computer Science minor, Catonsville, MD
07/2004 - 03/2006	MS, The Ohio State University, Mathematics, Columbus, OH
03/2006 - 08/2011	PhD, The Ohio State University, Mathematics, Columbus, OH
08/2013 - 05/2015	MS, Yale University, Computational Biology and Bioinformatics, New Haven, CT

Training:

09/2011 - 01/2012	Postdoctoral Associate, Computer Science, Yale University, New Haven, CT
02/2012 - 05/2013	Postdoctoral Associate, Neuroscience, Yale University, New Haven, CT
06/2013 - 05/2016	Postdoctoral Fellow, Medical Informatics, Yale University, New Haven, CT

Career/Academic Appointments:

06/2016 - 06/2019	Associate Research Scientist, Neuroscience, Yale School of Medicine, New Haven, CT
07/2019 - 06/2027	Assistant Professor, Biostatistics, Yale School of Medicine, New Haven, CT
07/2023 - 06/2027	Assistant Professor, Biomedical Informatics and Data Science, Yale School of Medicine, New Haven, CT (secondary)

Administrative Positions:

2022 - Present	Co-Training Director, Health Informatics MS, Yale School of Public Health, New Haven, CT

Grants/Clinical Trials History:

Current Grants

Agency:	National Institute of Mental Health
I.D.#:	R01MH086638
Title:	Extension of NEURON simulator for simulation of reaction-diffusion in neurons
P.I.:	William W Lytton and **Robert A McDougal**
Role:	Co-PI
Percent effort:	40%
Total costs:	$2,070,667.00 (of which $409,563.00 indirects)
Project period:	06/01/2010 - 04/30/2026
P.I. period:	07/01/2016 - 04/30/2026

Agency:	National Institute of Neurological Disorders and Stroke
I.D.#:	R01NS011613
Title:	Computer Methods for Physiological Problems
P.I.:	**Robert A McDougal** and Michael L Hines
Role:	PI
Percent effort:	20%
Total costs:	$2,051,875.00 (of which $826,875.00 indirects)
Project period:	07/01/1978 - 08/31/2028
P.I. period:	10/01/2023 - 08/31/2028

Agency:	National Institute of Allergy and Infectious Diseases
I.D.#:	U01 AI167892
Title:	HIPC Data Coordinating Center
P.I.:	Bjoern Peters, Steven Kleinstein
Role:	Collaborator
Percent effort:	15%
Total costs:	$9,830,805.00
Project period:	04/13/2022 - 03/31/2027

Agency:	National Institute of Allergy and Infectious Diseases
I.D.#:	U01 AI167892-04S2
Title:	HIPC Data Coordinating Center: AI Supplement
P.I.:	Bjoern Peters, Steven Kleinstein
Role:	Co-Investigator
Percent effort:	4%
Project period:	08/25/2025 - 03/31/2026

Agency:	The Wu Tsai Institute, Yale University
Title:	Grand Challenge: Foundation Models of the Brain
P.I.:	Steve Chang, Aaron Kuan, Michael Higley, Anirvan Nandy, Jane Taylor, Eve Lake, Hua Xu, Xenophon Papademetris, **Robert McDougal**, Hongyu Zhao, Smita Krishnaswamy, Shreya Saxena, David van Dijk
Role:	co-PI
Percent effort:	0% (supports 25% of a postdoctoral associate)
Project period:	September 2025 – August 2027, possible 1 year extension

Pending Grants

Agency:	National Institute of Mental Health
I.D.#:	R01MH086638
Title:	Extension of NEURON simulator for simulation of reaction-diffusion in neurons
P.I.:	**Robert A McDougal** and William W. Lytton
Role:	PI
Percent effort:	30%
Total costs:	$3,269,354.00 (of which $823,356.00 indirects)
Project period:	12/01/2026 - 11/30/2031
Status:	Assigned to study section

Past Grants

Agency:	National Institute of Allergy and Infectious Diseases
I.D.#:	U19 AI089992-09S4
Title:	Systems Immune Profiling of Divergent Responses to Infection; Core B: Data Management and Analysis
P.I.:	Steven Kleinstein
Role:	Co-Investigator
Percent effort:	10%
Total costs:	$454,168
Project period:	2020 – 2021 NCE

Agency:	National Institute on Deafness and Other Communication Disorders
I.D.#:	R01DC009977
Title:	SenseLab: Integration of Multidisciplinary Sensory Data
P.I.:	Robert A McDougal (in 2020-2021; in 2019-2020, mPI with Michael L. Hines; pre-2019: Gordon M. Shepherd)
Role:	PI (2020-2021); co-PI (2019-2020); Collaborator (2016-2019)
Percent effort:	2%
Total costs:	$3,598,734.00

Project period:	08/01/2009 - 07/31/2021 NCE
P.I. period:	07/01/2019 - 07/31/2021 NCE

Agency:	National Institute on Aging
I.D.#:	P30 AG066508
Title:	Yale Alzheimer Disease Research Group
P.I.:	Stephen Strittmatter
Role:	Collaborator
Percent effort:	7%
Direct costs per year:	$275,000
Project period:	2020 - 10/31/2021

Invited Speaking Engagements, Presentations & Workshops Not Affiliated With Yale:

International/National

1. "ModelView: extracting model structure and presenting it on the web with NEURON". Open Source Brain Conference, Alghero, Italy, May 2014. (Oral Presentation)
2. "The ModelDB repository as a tool for model development". Collaborative Development of Data-Driven Models of Neural Systems conference, Ashburn, VA, January 2016. (Oral Presentation)
3. "Neuronal calcium dynamics". University of São Paulo Ribeirão Preto NeuroMat workshop, Ribeirão Preto, Brazil, December 2016. (Oral Presentation)
4. "Knowledge dissemination: model sharing and outreach". Society for Simulation in Healthcare forum on Modeling and Simulation. Los Angeles, CA, January 2018. (Panel Speaker)
5. "Pretraining models on HPCs as a path toward larger local models". Organization for Computational Neurosciences workshop on Neuroscience Gateway enabling neuroscience software dissemination and large-scale neuronal modeling and data processing on supercomputers, Leipzig, Germany, July 2023. (Oral Presentation)
6. "Identifying and annotating computational neuroscience work using natural language processing techniques". Organization for Computational Neurosciences workshop on Neuro-inspired topology and machine learning, Leipzig, Germany, July 2023. (Oral Presentation)
7. "From molecules to systems: leveraging NEURON for multiscale modeling". International Society of Pharmacometrics Quantitative Systems Pharmacology Special Interest Group, Online, August 2024. (Oral Presentation)
8. “Toward practical multiscale brain simulation: Overcoming key computational bottlenecks.” EBRAINS workshop on multiscale modeling of brain systems, New York, NY, April 2026. (Oral presentation)

Regional

1. "NEURON strategies for the simulation and visualization of spatial mathematical neuroscience models". NJIT Mathematical Biology Seminar, Newark, NJ, February 2016. (Lecture)
2. “Enabling reproducible computer modeling for integrating experimental data: insights from computational neuroscience.” George Washington University Department of Epidemiology and Biostatistics seminar series, Washington, DC, January 2018. (Lecture)

3. “Synergistic computational approaches for catalyzing neuroscience research.” University of Oklahoma Computational Biology seminar series, Norman, OK, March 2018. (Lecture)
4. “Catalyzing multiscale neuroscience research.” University of Connecticut, Center for Cell Analysis and Modeling CCAM Seminar Series, Farmington, CT, January 2020. (Lecture)
5. “Neuroinformatics.” University of Connecticut, Nu Rho Psi National Honor Society in Neuroscience, Online, January 2021. (Lecture)
6. “Event-based approximations to in silico biophysical neuron models with partial history.” SUNY Downstate Biomedical Engineering Seminar Series, New York City, NY, January 2023. (Lecture)
7. “Event-based approximations to in silico biophysical neuron models with partial history.” University of California San Diego (UCSD) Health Department of Biomedical Informatics Seminar, Online, January 2023. (Lecture)
8. "Building a reproducible multiscale modeling ecosystem for computational neuroscience". Florida Atlantic University Center for Molecular Biology and Biotechnology (CMBB) Lecture Series, Jupiter, FL, September 2024. (Lecture)
9. “Empowering computational neuroscience: building modeling tools for today and innovating for tomorrow.” Florida Atlantic University, Boca Raton, FL, February 2025. (Lecture)

Peer-Reviewed Presentations Given at Meetings Not Affiliated With Yale:

International/National

1. **McDougal RA**, Janet Best. A mathematical model for intracellular PER protein dynamics. Society for Research on Biological Rhythms, Miramar Beach, FL, May 2008. (Poster Presentation)
2. **McDougal RA**, Zeki M, Lyman K, Terman DT. A working memory model based on excitatory-inhibitory interactions and calcium dynamics. Organization for Computational Neurosciences, San Antonio, TX, July 2010. (Poster Presentation)
3. **McDougal RA**, Terman DT. Novel patterns and dopamine modulation in a model of working memory. Workshop for Young Researchers in Mathematical Biology, Mathematical Biosciences Institute, The Ohio State University, Columbus, OH, August 2011. (Oral Presentation).
4. **McDougal RA**, Lytton WW, Hines ML. Object-oriented reaction-diffusion modeling in the NEURON simulator, Society for Neuroscience, Washington, DC, 2011. (Poster Presentation)
5. **McDougal RA**, Skolnick Y, Schaff JC, Lytton WW, Hines ML. Reaction-diffusion modeling in the NEURON simulator, Organization for Computational Neurosciences, Decatur, GA, July 2012. (Poster Presentation)
6. **McDougal RA**, Lytton WW, Hines ML. Modeling calcium waves and electrical dynamics in neurons. Mathematical Biosciences Institute, Workshop for Young Researchers in Mathematical Biology, Columbus, OH, 2012. (Poster Presentation)
7. **McDougal RA**, Lytton WW, Hines ML. Calcium-electrical interactions: an example of reaction-diffusion in the NEURON simulator. Society for Neuroscience, New Orleans, LA, October 2012. (Poster Presentation)
8. Neymotin S, Skolnick Y, **McDougal RA**, Hilscher M, Moulin T, Lytton W. Simulated relations of molecular, cellular, and neuronal network dynamics in a hippocampal network. Multiscale Modeling, National Institutes of Health, Bethesda, MD, 2012. (Poster Presentation)
9. **McDougal RA**, Hines ML, Lytton WW. Reaction-diffusion modeling in the NEURON simulator. Multiscale Modeling, National Institutes of Health, Bethesda, MD, 2012. (Poster Presentation)

10. Tropper C, Patoary MNI, **McDougal RA**, Hines ML, Lytton WW. Parallel stochastic simulation of neuronal reaction-diffusion equations, Society for Neuroscience, San Diego, CA, November 2013. (Poster Presentation)
11. Sherif MA, **McDougal R**, Neymotin S, Hines M, Lytton WW. Calcium wave propagation varies with changes in endoplasmic reticulum parameters: a computer model. Society for Neuroscience, San Diego, CA, November 2013. (Poster Presentation)
12. Hines ML, **McDougal RA**, Neymotin SA, Tropper C, Lytton WW. Interfaces in multiscale reaction-diffusion models in the NEURON simulator. Society for Neuroscience, San Diego, CA, November 2013. (Poster Presentation)
13. Morse TM, **McDougal RA**, Wang R, Hines ML, Marenco L, Carnevale NT, Shepherd GM. Using full text, context, and attributes to mine neuroscience models, Society for Neuroscience, San Diego, CA, November 2013. (Poster Presentation)
14. **McDougal RA**, Morse TM, Marenco L, Wang R, Hines ML, Carnevale NT, Shepherd GM. ModelView for ModelDB: Exploring model properties in a web browser, Society for Neuroscience, San Diego, CA, November 2013. (Poster Presentation)
15. **McDougal RA**, Shepherd GM. ModelView: An HTML5 Graphical Tool for Exploring Model Structures, NLM Informatics Training Conference, Pittsburgh, PA. (Oral Presentation)
16. Bulanova A, **McDougal RA**, Neymotin S, Mutai V, Lytton WW, Hines M. Integrating Systems Biology Markup Language (SBML) with NEURON, Organization for Computational Neurosciences, Quebec, QC, July 2014. (Poster Presentation)
17. Neymotin SA, **McDougal RA**, Hines M, Lytton WW. Calcium regulation of HCN supports persistent activity associated with working memory: a multiscale model of prefrontal cortex, Organization for Computational Neurosciences. Quebec, QC, July 2014. (Poster Presentation)
18. **McDougal RA**, Hines M, Lytton WW. A method for multi-simulator reaction-diffusion with NEURON, Organization for Computational Neurosciences, Quebec, QC, July 2014. (Poster Presentation)
19. Neymotin SA, **McDougal RA**, Hines ML, Lytton WW. Calcium regulation of HCN supports persistent activity associated with working memory: A multiscale model of prefrontal cortex, Multiscale Modeling, National Institutes of Health, Bethesda, MD, September 2014. (Poster Presentation)
20. **McDougal RA**, Bulanova A, Patoary MNI, Tropper C, Hines ML, Lytton WW. NEURON for multiscale simulations: reaction-diffusion meets electrophysiology, National Institutes of Health, Bethesda, MD, September 2014. (Poster Presentation)
21. Tropper C, Pataory M, **McDougal RA**, Hines ML, Lytton WW. Stochastic diffusion simulation in NEURON, Society for Neuroscience, Washington, DC, November 2014. (Poster Presentation)
22. Bulanova AS, **McDougal RA**, Neymotin SA, Mutai VK, Lytton WW, Hines ML. Integrating Systems Biology Markup Language (SBML) with NEURON, Society for Neuroscience, Washington, DC, November 2014. (Poster Presentation)
23. Neymotin SA, **McDougal RA**, Hines ML, Lytton WW. Calcium regulation of HCN supports persistent activity associated with working memory: A multiscale model of prefrontal cortex, Society for Neuroscience, Washington, DC, November 2014. (Poster Presentation)
24. Shepherd GM, **McDougal RA**, Wang R, Morse TM, Carnevale NT, Marenco LN, Migliore M, Miller PL. 3D printouts of neurons and microcircuits, Society for Neuroscience, Washington, DC, November 2014. (Poster Presentation)

25. Morse TM, **McDougal RA**, Wang R, Marenco L, Hines M, Carnevale NT, Miller P, Shepherd GM. Advances in Senselab: ModelView, synaptic connectivity, and structured data submission, Society for Neuroscience, Washington, DC, November 2014. (Poster Presentation)
26. **McDougal RA**, Hines ML, Lytton WW. Calcium 'impedance mismatch' – the role of geometry on diffusion dynamics, Society for Neuroscience, Washington, DC, November 2014. (Poster Presentation)
27. Seidenstein AH, **McDougal RA**, Hines ML, Lytton WW. Parallelizing large networks using NEURON-Python, Organization for Computational Neurosciences, Prague, Czech Republic, July 2015. (Poster Presentation)
28. **McDougal RA**, Hines ML, Lytton WW. Coupling 1D and 3D domains in neuroscience simulations, Multiscale Modeling, National Institutes of Health, Bethesda, MD, September 2015. (Poster Presentation)
29. Seidenstein A, Neymotin SA, Fesharaki A, Hines ML, **McDougal RA**, Bulanova AS, Lytton WW. Neuronal network bump attractors augmented by calcium up-regulation of Ih in a multiscale computer model of prefrontal cortex, Society for Neuroscience, Chicago, IL, October 2015. (Poster Presentation)
30. Tropper C, Lin Z, **McDougal RA**, Hines M, Lytton W. Parallel reaction-diffusion simulation in NEURON, Society for Neuroscience, Chicago IL, October 2015. (Poster Presentation)
31. Marenco L, Wang R, **McDougal RA**, Morse TM, Carnevale NT, Miller P, Shepherd GM. Exploring data-driven techniques for visual representation of neuronal micro-connectomes, Society for Neuroscience, Chicago, IL, October 2015. (Poster Presentation)
32. Morse TM, **McDougal RA**. Unified real-time searching of keywords and attributes in ModelDB, Society for Neuroscience, Chicago, IL, October 2015. (Poster Presentation)
33. **McDougal RA**, Bulanova AS, Hines ML, Lytton WW. Hybrid 1d/3d reaction-diffusion in the NEURON simulator, Society for Neuroscience, Chicago, IL, October 2015. (Poster Presentation)
34. **McDougal RA**, Neymotin SA, Morse TM, Hines ML, Lytton WW, Shepherd GM. Developing models with NEURON and ModelDB, Mathematical Biosciences Institute, Modeling and Computation of Transmembrane Transport Workshop, Columbus, OH, 2015. (Poster Presentation)
35. Morse TM, Marenco L, **McDougal RA**, Wang R, Hines ML, Carnevale NT, Cavarretta F, Migliore M, Crasto C, Miller P, Shepherd GM. Advances in SenseLab's interoperable neuroinformatics databases: FunctionalMicroconnectomeDB and ModelDB, AChemS XXXVIII, Bonita Springs, FL, 2016. (Poster Presentation)
36. Ikeno H, Yamazaki T, Kannon T, Okumura Y, Kamiyama Y, Ishihara A, Inagaki K, Hirata Y, Satoh S, Wagatsuma H, Asai Y, Yamaguchi Y, **McDougal R**, Wang R, Marenco L, Morse T, Shepherd G, Usui S. Development of an on-line simulation environment for computational neuroscience, Advances in Neuroinformatics, Wakō, Saitama, Japan, 2016. (Poster Presentation)
37. Marenco L, Wang R, **McDougal RA**, Morse TM, Carnevale NT, Miller PL, Shepherd GM. Development of FunctionalConnectomeDB within SenseLab to incorporate and mine functional connectomics data, Society for Neuroscience, San Diego, CA, November 2016. (Poster Presentation)
38. Seidenstein A, **McDougal RA**, Hines ML, Lytton WW. Mosaic multiscale computer modeling of ischemic stroke, Society for Neuroscience, San Diego, CA, November 2016. (Poster Presentation)

39. Morse TM, **McDougal RA**, Carnevale NT, Marenco L, Wang R, Migliore M, Miller PL, Shepherd GM, Hines ML. Recent advances in ModelDB, Society for Neuroscience, San Diego, CA, November 2016. (Poster Presentation)
40. Shepherd GM, Morse TM, **McDougal RA**. Automated metadata identification for better model discovery, Society for Neuroscience, San Diego, CA, November 2016. (Poster Presentation)
41. **McDougal RA**, Tropper C, Hines ML, Lytton WW. Expanding NEURON support for reaction-diffusion models, Society for Neuroscience, San Diego, CA, November 2016. (Poster Presentation)
42. Newton AJH, **McDougal RA**, Tropper C, Seidenstein AH, Lytton WW. Expanding NEURON to bridge electrophysiology, chemical, and network scales: simulations of ischemic stroke, Multiscale Modeling, National Institutes of Health, Bethesda, MD, March 2017. (Poster Presentation)
43. Newton A, Seidenestein A, **McDougal R**, Lytton W. Multiscale modeling of ischemic stroke with the NEURON reaction-diffusion model, Organization for Computational Neurosciences, Antwerp, Belgium, July 2017. (Poster Presentation)
44. **McDougal R**, Lytton W. Accelerating NEURON reaction-diffusion simulations, Organization for Computational Neurosciences, Antwerp, Belgium, July 2017. (Poster Presentation)
45. **McDougal RA**, Hines ML, Lytton WW. Using NEURON to incorporate reaction-diffusion into cellular and network models, Reaction-diffusion modeling for neurobiology workshop, Organization for Computational Neurosciences workshop, Antwerp, Belgium, July 2017. (Oral Presentation)
46. **McDougal RA**, Hines ML, Lytton WW. Multiscale modeling with the NEURON Reaction-Diffusion Module, Multiscale modeling and simulation workshop, Bernstein Conference, Göttingen, Germany, September 2017. (Oral Presentation)
47. Neymotin SA, Peled N, **McDougal RA**, Carnevale NT, Hines ML, Hamalainen M, Jones SR. Human neocortical neurosolver (HNN): A new computational tool for localizing and interpreting human neocortical dynamics, Society for Neuroscience, Washington, DC, November 2017. (Poster Presentation)
48. Surles-Zeigler M, Morse TM, **McDougal RA**, Shepherd GM. Integrating molecular markers and gene expression in SenseLab for neuroinformatics-driven discovery, Society for Neuroscience, Washington, DC, November 2017. (Poster Presentation)
49. Seidenstein A, Newton A, **MacDougal** (*sic)* **RA**, Lytton WW. Multiscale computer modeling of penumbral zones in brain ischemia, Society for Neuroscience, Washington, DC, November 2017. (Poster Presentation)
50. Newton A, **McDougal RA**, Hines ML, Miyazaki K, Ross WN, Lytton WW. Modeling electrodiffusion with the NEURON reaction-diffusion module, Society for Neuroscience, Washington, DC, November 2017. (Poster Presentation)
51. Morse TM, Wang R, Carnevale NT, Shepherd GM, **McDougal RA**. Pipeline to promote discovery and sharing of computational neuroscience research, Society for Neuroscience, Washington, DC, November 2017. (Poster Presentation)
52. **McDougal RA**, Newton AJH[†], Patoary MNI, Tropper C, Hines ML, Lytton WW. Parallel stochastic spines in NEURON reaction-diffusion simulations, Society for Neuroscience, Washington, DC, November 2017. (Poster Presentation)
53. Newton AJH[†], Seidenstein AH, **McDougal RA**, Hines ML, Lytton WW. Expanding NEURON extracellular reaction-diffusion support: simulation of ischemic stroke, Multiscale Modeling, National Institutes of Health, Bethesda, MD, March 2018. (Poster Presentation)

54. Newton AJH[†], Seidenstein AH, **McDougal RA**, Hines ML, Lytton WW. Extracellular reaction-diffusion in the NEURON simulator: modeling ischemic stroke, Organization for Computational Neurosciences, Seattle, WA, July 2018. (Poster Presentation)
55. **McDougal RA**, Newton AJH[†], Lytton WW. Building and visualizing reaction-diffusion simulations in NEURON cellular mechanisms, Organization for Computational Neurosciences, Seattle, WA, July 2018. (Poster Presentation)
56. **McDougal RA**, Hines ML. Strategies for Parallel NEURON Simulations, Organization for Computational Neurosciences workshop, Seattle, WA, July 2018. (Oral Presentation)
57. Neymotin SA, Daniels DS, Peled N, **McDougal RA**, Carnevale NT, Moore CI, Hines ML, Hamalainen M, Jones SR. Human neocortical neurosolver (HNN): a new software tool for interpreting the circuit level origin of human MEG/EEG data, Society for Neuroscience, San Diego, CA, November 2018. (Poster Presentation)
58. Newton A[†], Seidenstein AH, Hines ML, **McDougal RA**, Lytton WW. Multiscale simulation of spreading depolarization in ischemic stroke, Society for Neuroscience, San Diego, CA, November 2018. (Poster Presentation)
59. Surles-Zeigler M, Morse TM, **McDougal RA**, Shepherd GM. Integrating gene and protein data into SenseLab databases for neuroinformatics-driven discovery, Society for Neuroscience, San Diego, CA, November 2018. (Poster Presentation)
60. Morse TM, **McDougal RA**. Enhancing computational model discovery via network visualization and analysis, Society for Neuroscience, San Diego, CA, November 2018. (Poster Presentation)
61. **McDougal RA**, Newton A[†], Hines ML, Lytton WW. Building, simulating, and visualizing reaction-diffusion models with NEURON's enhanced rxd module, Society for Neuroscience, San Diego, CA, November 2018. (Poster Presentation)
62. Conte C[†], Newton AJH[†], Eggleston L[†], Hines ML, Lytton WW, **McDougal RA**. Accelerating 3D intracellular NEURON simulations, Organization for Computational Neurosciences, Barcelona, Spain, July 2019. (Poster Presentation)
63. Caldwell B, Neymotin SA, Daniels D, Jas M, Peled N, **McDougal RA**, Dura-Bernal S, Cantarelli M, O'Connell MN, Barczak A, McGinnis TM, Lakatos P, Moore CI, Carnevale NT, Hines ML, Hamalainen M, Jones SR. Human neocortical neurosolver: a user-friendly software tool for cellular- and circuit-level interpretation of EEG/MEG, Society for Neuroscience, Chicago, IL, October 2019. (Poster Presentation)
64. Newton AJH[†], Hines ML, Lytton WW, **McDougal RA**. Homeostasis and spreading depolarization in multiscale simulation of ischemic stroke, Society for Neuroscience, Chicago, IL, October 2019. (Poster Presentation)
65. Newton AJH[†], Conte C[†], Eggleston L[†], Blasy E[†], Hines ML, Lytton WW, **McDougal RA**. Efficient *in silico* 3D intracellular neuron simulation, Society for Neuroscience, Chicago, IL, October 2019. (Poster Presentation)
66. Cudone E[†], Taylor RA, **McDougal RA**. Unsupervised literature tagging of computational neuroscience literature, towards question answering, NLM Informatics Training Conference, Online, 2020. (Poster Presentation)
67. Cudone E[†], **McDougal R**. Unsupervised metadata tagging of computational neuroscience literature, towards question answering, Organization for Computational Neurosciences, Online, July 2020. (Poster Presentation)

68. Newton AJH[†], Kelley C, Hines ML, Lytton WW, **McDougal RA**. Multiscale simulations of ischemia and spreading depolarization with NEURON, Organization for Computational Neurosciences, Online, July 2020. (Poster Presentation)
69. **McDougal RA**, Eggleston, L[†]. The NEURON simulator, Organization for Computational Neurosciences workshop on tools and resources for developing and sharing models in computational neuroscience, Online, July 2020. (Oral Presentation)
70. Cudone E[†], **McDougal R**. Next-spike-time variation in biophysical computational neuroscience models, NLM Informatics Training Conference, Online, June 2021. (Oral Presentation)
71. Mullin S, **McDougal R**, Cheung K, Kilicoglu H, Beck A, Zeiss C. Chemical Entity Normalization for Successful Translational Development of Alzheimer's Disease and Dementia Therapeutics, International Society for Computational Biology Conference, Online, July 2021. (Oral presentation).
72. Fereydooni S, Brandt C, Runels T, **McDougal R**, Gandhi P, Carol O, Wang K. Identifying patient's country of origin with modified spaCy NLP models, AMIA, Washington, DC, November 2022. (Poster Presentation)
73. Newton A, Kelley C, **McDougal RA**, Lytton WW. Multiscale simulations of spreading depolarization with ischemic effects, Society for Neuroscience, San Diego CA, November 2022. (Poster Presentation)
74. Newton AJH, **McDougal R**, Lytton WW, Kelley C, Guo A[†], Wang J[†], Zink S, DiStasio M. Modeling hypoxia and spreading depolarization at the subcellular, population, and network scales, Organization for Computational Neurosciences, Leipzig, Germany, July 2023. (Poster Presentation)
75. Cudone E[†], **McDougal R**. Spike-time and state prediction from limited synaptic and spiking history, Organization for Computational Neurosciences, Leipzig, Germany, July 2023. (Poster Presentation)
76. Newton A, Kelley C, Guo A[†], Wang J[†], Zink S, Distasio M, **Mcdougal RA**, Lytton W. Subcellular to tissue scale modeling of ischemia and spreading depolarization, International Brain Research Organization (IBRO) World Congress of Neuroscience, Granada, Spain, September 2023. (Poster Presentation)
77. Leite Pereira F, King JG, Kumbhar PS, Awile O, Savulescu AL, Magkanaris I, Lupton O, Ji W, Blanco J, Cornu N, Lytton W, **McDougal RA**, Dura-Bernal S, Hines ML. A leap on large-scale brain simulation performance: NEURON 9.0 and Neurodamus, Society for Neuroscience, Washington, DC, November 2023. (Poster Presentation)
78. Newton AJH, Kelley C, Guo S[†], Wang J[†], Zink S, Distasio MM, **McDougal RA**, Lytton WW. Multiscale modeling of ischemia and spreading depolarization, Society for Neuroscience, Washington, DC, November 2023. (Poster Presentation)
79. Ji Z[†], Guo S[†], **McDougal R**. Automating neuroscience model identification and characterization, Society for Neuroscience, Washington, DC, November 2023. (Poster Presentation)
80. Newton AJH, Kelley C, Guo S[†], Wang J[†], Zink S, DiStasio M, **McDougal RA**, Lytton WW. Spreading depolarization in neocortical microcircuits, Organization for Computational Neurosciences, Natal, Brazil, July 2024. (Poster Presentation)
81. Wang Y-C[†], Guo S[†], Newton A, **McDougal RA**, Lytton WW, DiStasio M. Capillary density and neuronal homeostasis in human primary visual cortex, Society for Neuroscience, Online, October 2024. (Online-only Poster Presentation)
82. Newton AJH, Kelley C, Wang Y-C, Zink S, DiStasio MM, **McDougal RA**, Lytton WW. Human capillary identification used to simulate spreading depression in control and ischemic neocortical microcircuits, Society for Neuroscience, Chicago, IL, October 2024. (Poster Presentation)

83. Lytton W, Lee J-H, Choi E, **McDougal RA**. Gpt-4 using history and physical localizes stroke lesions, Society for Neuroscience, Chicago, IL, October 2024. (Poster Presentation)
84. Choi E, Lee J-H, **McDougal R**, Lytton WW. Leveraging Generative Artificial Intelligence in Diagnosis of Thrombotic Microangiopathies: Focus on Thrombotic Thrombocytopenic Purpura, American Society for Hematology, San Diego, CA, December 2024. (Poster Presentation)
85. Cohen I[†], Cai X[†], Du M[†], Kong Y[†], Yu H[†], **McDougal RA**. Linking biological context to models with ModelDB, Organization for Computational Neurosciences, Florence, Italy, July 2025. (Poster Presentation)
86. Newton AJH, Kelley C, Guo S[†], Wang J[†], Zink S, DiStasio M, **McDougal RA**, Lytton WW. Modeling spreading depolarization in control and ischemic neocortical microcircuits using immunostained identify capillaries, Organization for Computational Neurosciences, Florence, Italy, July 2025. (Poster Presentation)
87. Romaro C[†], Lytton WW, **McDougal RA**. Local multi-gridding for detailed morphology, spines and synapses, Organization for Computational Neurosciences, Florence, Italy, July 2025. (Poster Presentation)
88. Safar N[†], **McDougal RA**. Extending the NEURON Simulator with MATLAB: a New Interface for Integrated Neural Simulation and Analysis, Organization for Computational Neurosciences, Florence, Italy, July 2025. (Poster Presentation)
89. Romaro C[†], Lytton WW, **McDougal RA**. Simulation tool for prediction of ion and molecule propagation and distribution in detailed dendritic trees, Society for Neuroscience, San Diego, CA, November 2025. (Poster Presentation)
90. Mitra S, Lytton WW, Antic SD, **McDougal RA**. Impact of dendritic morphology on the generation of glutamate-mediated dendritic plateau potentials, Society for Neuroscience, San Diego, CA, November 2025. (Poster Presentation)
91. Newton AJH, Kelley C, Guo S[†], Zink S, DiStasio MM, **McDougal RA**, Lytton WW. Simulations of spreading depression in neocortical microcircuits using human capillary data, Society for Neuroscience, San Diego, CA, November 2025. (Poster Presentation)
92. Cohen I[†], Yu H[†], **McDougal RA**. All Models are Wrong, Some are Annotated: Automating Metadata in Biomedical Repositories, AMIA Annual Symposium, Atlanta, GA, November 2025. (Poster Presentation)

Regional

1. Neymotin SA, Skolnick Y, Hilscher MM, Moulin T, **McDougal RA**, Hines ML, Lytton WW. Ih tunes theta/gamma oscillations and cross-frequency coupling in an in silico CA3 model. Rhythmic Dynamics and Cognition Conference, MIT, Boston, MA, 2013. (Poster Presentation)
2. Cudone E[†], **McDougal RA**. Empirically-based event-drive neuron model. Frontiers in Applied and Computational Mathematics. Newark, NJ. May 2022. (Poster Presentation)

[†] Mentee; see CV2 for details of mentees from the last five years.

Professional Service:

Peer Review Groups/Grant Study Sections

2015	Ad-hoc Member, Neurotransporters, Receptors, Channels and Calcium Signaling
2017	Member, Special Review Group ZMH1 ERB-C (04) Data Archives and Standards for the BRAIN Initiative. NIH/NIMH
2018	Ad-hoc member, study section on MSM (PAR-15-085), NIH.
2019	Ad-hoc member, study section on Neurotransporters, Receptors, Channels and Calcium Signaling (NTRC), NIH.
2020	Member, Special Emphasis Panel ZGM1 BBCB-4 (NR), NIH/NIGMS (March, November).
2021	Mail reviewer, study section on Synapses, Cytoskeleton and Trafficking 2021/05 SYN.
2023, 2024	Ad-hoc member, study section on Brain Initiative TMM RFA (DA-23-039), NIBIB, NIH.

Advisory Boards

2016 – 2019	NeuroML Editorial Board
2020 – present	NeuroML Scientific Committee

Journal Services

Editorial boards

2017 - 2021	Guest Associate Editor, *Frontiers in Neuroinformatics*, Research topic on: "Reproducibility and Rigour in Computational Neuroscience."
2022 - present	Associate Editor, *Frontiers in Systems Biology* section on Integrative Systems Neuroscience.

Reviewer

Neural Networks, Journal of Computational Neuroscience, Neuroinformatics, Frontiers in Neuroinformatics, Frontiers in Cellular Neuroscience, Journal of Neuroscience Methods, PLOS Computational Biology

Professional Organizations

2007 - Present	Member, American Mathematical Society
2007 - Present	Member, Society for Industrial and Applied Mathematics
2011 - Present	Member, Society for Neuroscience
2012 - Present	Member, Organization for Computational Neuroscience
2019 - Present	Member, American Medical Informatics Association
2024 - 2025	Board Member and Deputy Infrastructure Chair, Organization for Computational Neuroscience
2026 - Present	Board Member and Infrastructure Chair, Organization for Computational Neuroscience

Yale University

Department

2019 - 2026	Member, Biostatistics Department, Health Informatics Admissions Committee
2024 - Present	Member, Biostatistics Department, Health Informatics Faculty Search Committee

School

2024 - Present	Member, Yale School of Public Health, Data Science Task Force

Public Service

2013	Judge, New Haven Public School Science Fair
2013-2019, 2021	Judge, Connecticut STEM Fair (formerly Southern Connecticut Invitational Science & Engineering Fair)
2014 - 2016	Tutor, Summer web development course. New Haven Reads
2018 - 2026	Judge, SIAM/MathWorks Math Modeling Competition
2023	Judge, CT Junior Science and Humanities Symposium
2026	Judge, CT High School Science and Humanities Symposium

Bibliography:

Peer-Reviewed Original Research

1. Gu Y, Barry J, **McDougel R** (*sic*), Terman D, Gu C. Alternative splicing regulates kv3.1 polarized targeting to adjust maximal spiking frequency. *The Journal Of Biological Chemistry* 2012, 287: 1755-69. PMID: 22105078 , PMCID: PMC3265858 , DOI: 10.1074/jbc.M111.299305.
2. **McDougal RA**, Hines ML, Lytton WW. Reaction-diffusion in the NEURON simulator. *Frontiers In Neuroinformatics* 2013, 7: 28. PMID: 24298253 , PMCID: PMC3828620 , DOI: 10.3389/fninf.2013.00028 .
3. **McDougal RA**, Hines ML, Lytton WW. Water-tight membranes from neuronal morphology files. *Journal Of Neuroscience Methods* 2013, 220: 167-178. PMID: 24091136 , PMCID: PMC4197804 , DOI: 10.1016/j.jneumeth.2013.09.011 .
4. Neymotin SA*, **McDougal RA***, Sherif MA, Fall CP, Hines ML, Lytton WW. Neuronal Calcium Wave Propagation Varies with Changes in Endoplasmic Reticulum Parameters: A Computer Model. *Neural Computation* 2015, 27: 898-924. PMID: 25734493 , PMCID: PMC4386758 , DOI: 10.1162/neco_a_00712 .
5. **McDougal RA**, Morse TM, Hines ML, Shepherd GM. ModelView for ModelDB: Online Presentation of Model Structure. *Neuroinformatics* 2015, 13: 459-470. PMID: 25896640 , PMCID: PMC4618280 , DOI: 10.1007/s12021-015-9269-2 .
6. **McDougal RA**, Shepherd GM. 3D-printer visualization of neuron models. *Frontiers In Neuroinformatics* 2015, 9: 18. PMID: 26175684 , PMCID: PMC4485057 , DOI: 10.3389/fninf.2015.00018 .
7. Neymotin SA, **McDougal RA**, Bulanova AS, Zeki M, Lakatos P, Terman D, Hines ML, Lytton WW. Calcium regulation of HCN channels supports persistent activity in a multiscale model of neocortex. *Neuroscience* 2015, 316: 344-366. PMID: 26746357 , PMCID: PMC4724569 , DOI: 10.1016/j.neuroscience.2015.12.043 .

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10. Lin Z, Tropper C, Yao Y, **Mcdougal RA**, Patoary M, Lytton WW, Hines ML. Load balancing for multi-threaded PDES of stochastic reaction-diffusion in neurons. *Journal Of Simulation* 2017, 11: 267-284. PMID: 29225664 , PMCID: PMC5720372 , DOI: 10.1057/s41273-016-0033-x .
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13. **McDougal RA**, Dalal I[†], Morse TM, Shepherd GM. Automated Metadata Suggestion During Repository Submission. *Neuroinformatics* 2018, 17: 361-371. PMID: 30382537 , PMCID: PMC6494730 , DOI: 10.1007/s12021-018-9403-z .
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20. Awile O, Kumbhar P, Cornu N, Dura-Bernal S, King JG, Lupton O, Magkanaris I, **McDougal RA**, Newton AJH, Pereira F, Săvulescu A, Carnevale NT, Lytton WW, Hines ML, Schürmann F. Modernizing the NEURON Simulator for Sustainability, Portability, and Performance. *Frontiers In Neuroinformatics* 2022, 16: 884046. PMID: 35832575 , PMCID: PMC9272742 , DOI: 10.3389/fninf.2022.884046 .
21. Kelley C, Newton AJH, Hrabetova S, **McDougal RA**, Lytton WW. Multiscale Computer Modeling of Spreading Depolarization in Brain Slices. *eNeuro* 2022, 9: eneuro.0082-22.2022. PMID: 35927026 , PMCID: PMC9410770 , DOI: 10.1523/eneuro.0082-22.2022 .
22. Yuan P, Zhang M, Tong L, Morse T, **McDougal RA**, Ding H, Chan D, Cai Y, Grutzendler J. PLD3 affects axonal spheroids and network defects in Alzheimer's disease. *Nature* 2022, 612: 328-337. PMID: 36450991 , PMCID: PMC9729106 , DOI: 10.1038/s41586-022-05491-6 .
23. Newton A[†], Chartash D[†], Kleinstein S, **McDougal RA**. A pipeline for the retrieval and extraction of domain-specific information with application to COVID-19 immune signatures. *BMC Bioinformatics* 2023, 24: 292. PMID: 37474900 , PMCID: PMC10357743 , DOI: 10.1186/s12859-023-05397-8 .
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Chapters, Books, and Reviews

32. Shepherd G, Morse T, Marenco L, Cheung K, Carnevale T, Migliore M, **McDougal R**, Hines M, Miller P. SenseLab: Integration of Multidisciplinary Neuroscience Data. In: Jaeger D, Jung R. (Ed.) *Encyclopedia of Computational Neuroscience*: SpringerReference 2015, 2655-2657. DOI: 10.1007/978-1-4614-6675-8_497 .
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Protocols

40. Aneni K, Chen C, Meyer J, Cho Y, Lipton Z, Kher S, Jiao M, de la Vega I, Umutoni F, **McDougal RA**, Fiellin L. Identifying Game-Based Digital Biomarkers of Cognitive Risk for Adolescent Substance Misuse: Protocol for a Proof-of-Concept Study. *JMIR Research Protocols* 2023, 12: e46990. PMID: 37995115 , PMCID: PMC10704313 , DOI: 10.2196/46990 .

Editorials

41. Crook SM, Davison AP, **McDougal RA**, Plesser HE. Editorial: Reproducibility and Rigour in Computational Neuroscience. *Frontiers In Neuroinformatics* 2020, 14: 23. PMID: 32536859 , PMCID: PMC7267030 , DOI: 10.3389/fninf.2020.00023 .

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† Mentee; see CV2 for details of mentees from the last five years.