Achira Roy, MSc, PhD

Assistant Professor
Neuroscience Unit (NSU), Room No. B-201
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The Neurodevelopment Lab

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Education

2013 — **PhD, Department of Biological Sciences**
Tata Institute of Fundamental Research, Mumbai, India
Thesis Title: "*Lhx2 is necessary for patterning the forebrain midline*"
Advisor: Dr. Shubha Tole

2007 — **Master of Science (MSc), Biophysics and Molecular Biology**
University College of Science & Technology, University of Calcutta, Kolkata, India
77.4% (Ist class)

2005 — **Bachelor of Science (BSc), Zoology (Honours), Chemistry, Physiology**
Presidency College, University of Calcutta, Kolkata, India
71% (Ist class); University Rank: **4th** (in Zoology Honours, out of 12000 students)

Research/Professional Experience

July 2023 – current — **Assistant Professor**
Neuroscience Unit
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, India

Sep 2021 – July 2023 — **DBT-Ramalingaswami Fellow**
Neuroscience Unit
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, India

Sep 2013 – Aug 2021 — **Postdoctoral Fellow**
(Developmental and Translational Biomedical Neuroscience)
Seattle Children's Research Institute (SCRI), Seattle, USA
Advisor: Dr. Kathleen J. Millen

Nov 2007 – Jan 2013 — **PhD Research Scholar**
(Developmental Neuroscience)
Tata Institute of Fundamental Research (TIFR), Mumbai, India
Advisor: Dr. Shubha Tole

2006 — **Postgraduate Summer Research Fellow**
(Molecular Mycology)
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, India under JNCASR Summer Research Fellowship
Advisor: Dr. Kaustuv Sanyal

2003 — **Undergraduate Summer Visiting-Student Fellow**
(Anthropology and Human Genetics)
Indian Statistical Institute (ISI), Kolkata, India
under Indian Academy of Sciences (IAS) summer fellowship
Advisor: Dr. Partha P. Majumder

Areas of Specialization & Research Interests

- Developmental neurobiology (with expertise in forebrain development); neurogenetics
- Translational biomedical research using mouse models of human neurodevelopmental disorders

Citizenship: India

ORCID: http://orcid.org/0000-0002-6274-0667

Awards, Honours and Fellowships

Sep 2023	**Ben Barres Spotlight Award** Runner-up, by eLife Science Publications Ltd, USA
Jun 2022	**International Research Donation** towards studying rare neurodevelopmental disorders by the M-CM Network, New York, USA, in recognition of the work presented at the International Scientific Meeting for PIK3CA Related Conditions
2021 – 2026	**Ramalingaswami Re-entry Fellowship** Department of Biotechnology, Ministry of Science and Technology, India
Nov 2021	**Emerging Leaders Scholarship** CLOVES Syndrome Community of Chan Zuckerberg Initiative, to attend and present an invited talk at the International Scientific Meeting for PIK3CA Related Conditions
2020	**Top 20 Winner of #StemCellfie Contest 2020** STEMCELL Technologies Inc., Canada
2017	**Professional Development Award** Seattle Children's Research Staff Development Committee, Seattle, USA
2016	**ISDN 2016 Travel Award** 21st Biennial Meeting of the International Society for Developmental Neuroscience (ISDN), Antibes-Juan les Pins, France
2014	**Best Poster Award** Joint Meeting of the 20th Biennial Meeting of the ISDN and the 5th Annual NeuroDevNet Brain Development Conference, Montreal, Canada
2012	**International Travel Support/Grant (DBT-CTEP)** for EMBO conference, Heidelberg Department of Biotechnology, Ministry of Science and Technology, India
2012	**Best Poster Award** 19th Biennial Meeting of the ISDN, Mumbai, India
2007 – 2012	**PhD Research Scholarship** Tata Institute of Fundamental Research, Mumbai, India
2007	**Junior Research Fellowship** in Life Sciences, under the Council of Scientific & Industrial Research (**CSIR-JRF**) fellowship scheme, India, *qualified*
2007	**Graduate Aptitude Test in Engineering (GATE)**, India, *qualified*
2006	**Summer Research Fellowship** Programme (**SRFP**), Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), India
2005	**University Rank certificate (4th in BSc, Zoology Honours)** University of Calcutta, Kolkata, India
2003	**Summer Visiting Student-fellowship**, Indian Academy of Sciences (IAS), India

Professional Affiliations

2008 – present Member, Society for Neuroscience (SfN)
2010 – present Life member, Indian Academy of Neurosciences (IAN)
2018 – present Member, Society for Developmental Biology (SDB)
2023 – present Member, Indian Society for Developmental Biology (InSDB)

Funding

Ongoing:

1. **Ben Barres Spotlight Award** *Runner-up* **(USD 3500)**
   Agency: eLife Science Publications Ltd, USA
   Role: Principal Investigator
   Date: Oct 2023 – Dec 2024
   https://elifesciences.org/inside-elife/a3b3cf09/ben-barres-spotlight-awards-announcing-the-winners-for-2023

2. **International Research Donation** to Neurodevelopment Lab, JNCASR, towards studying rare neurodevelopmental disorders **(USD 20,000)**
   Agency: M-CM Network, New York, USA
   Role: Principal Investigator
   Date: June 2022
   https://www.m-cm.net/blog/post/donation_to_the_neurodevelopment_lab_of_dr_achira_roy_at_jncasr

3. **Ramalingaswami Re-entry Fellowship** **(INR 1,13,90,000)**
   Title: Determining mechanisms of early ependymal development which when disrupted, contribute to hydrocephalus
   Agency: Department of Biotechnology, Ministry of Science & Technology, India
   Role: Principal Investigator
   Period: Sep 2021 – Sep 2026

Completed:

1. **Hydrocephalus Association 2018 Innovator Award** **(USD 50,000)**
   Title: Preclinical assessment of small molecule therapy for post-hemorrhagic hydrocephalus
   Agency: Hydrocephalus Association, USA
   Role: Co-investigator and Key personnel
   Period: Dec 2018 – Apr 2020

Publications (*****: corresponding author(s); †**:** significant publication)

Total publications: 14 peer-reviewed publications (first-author articles: **8**; co-corresponding author: **2**); 2 non-reviewed publications
H-index *(Google scholar)***:** 12
i10 index: 12

Peer-reviewed Research Articles:

†2021 **Roy A***, Han VZ, Bard AM, Wehle DT, Smith SEP, Ramirez JM, Kalume F, Millen KJ*****. Non-synaptic cell-autonomous mechanisms underlie neuronal hyperexcitability in a genetic model of PIK3CA-driven intractable epilepsy. ***Frontiers in Molecular Neuroscience***, 2021; 14:772847. PMID: 34899181, PMCID: PMC8662737. Citations: 6.

†2020 **Roy A**, Millen KJ, Kapur RP. Hippocampal granule cell dispersion: a non-specific finding in pediatric patients with no history of seizures. ***Acta Neuropathologica Communications.*** 2020; 8(1):54. PMID: 32317027, PMCID: PMC7171777. Citations: 20.

2020 **Roy A*,** Deng M, Aldinger KA, Glass IA, Millen KJ*. Laser Capture Micro-dissection (LCM) of neonatal mouse forebrain for RNA isolation. ***Bio-protocol.*** 2020; Jan 5;10(1): e3475. PMID: 32190713**,** PMCID: PMC7079735. Citation: 2.

2019 Chizhikov VV*, Iskusnykh IY, Steshina EY, Fattakhov N, Lindgren AG, Shetty AS, **Roy A**, Tole S, Millen KJ*. Early dorsomedial tissue interactions regulate gyrification of distal neocortex. ***Nature Communications.*** 2019; 10(1):5192. PMID: 31729356, PMCID: PMC6858446. Citations: 15.

†2019 **Roy A**, Murphy RM, Deng M, MacDonald JW, Bammler TK, Aldinger KA, Glass IA, Millen KJ. PI3K-Yap activity drives cortical gyrification and hydrocephalus in mice. ***eLife****.* 2019; May 16;8. pii: e45961. PMID: 31094678, PMCID: PMC6544437. Citations: 28.

2018 Godbole G, Shetty AS, **Roy A,** Chen B, Miyoshi G, Fishell G, Tole S. Hierarchical genetic interactions between FOXG1 and LHX2 regulate the formation of the cortical hem in the developing telencephalon. ***Development.*** 2018; 145(1): dev154583. PMID: 29229772; PMCID: PMC5825872. Citations: 41.

2017 Godbole G, **Roy A**, Shetty AS, Tole S. Novel functions of LHX2 and PAX6 in the developing telencephalon revealed upon combined loss of both genes. ***Neural Development.*** 2017; Nov 15;12(1):19. PMID: 29141678, PMCID: PMC5688701. Citations: 18.

2016 Di Donato N, Jean YY, Maga AM, Krewson BD, Shupp AB, Avrutsky MI, **Roy A,** Collins S, Olds C, Willert RA, *et al*…Jinks RN. Mutations in CRADD Result in Reduced Caspase-2-Mediated Neuronal Apoptosis and Cause Megalencephaly with a Rare Lissencephaly Variant. ***American journal of human genetics****.* 2016; 99(5):1117-1129. PMID: 27773430, PMCID: PMC5097945. Citations: 60.

†2015 **Roy A,** Skibo J, Kalume F, Ni J, Rankin S, Lu Y, Dobyns WB, Mills GB, Zhao JJ, Baker SJ, Millen KJ. Mouse models of human PIK3CA-related brain overgrowth have acutely treatable epilepsy. ***eLife****.* 2015; Dec 3;4. pii: e12703. PMID: 26633882, PMCID: PMC4744197. Citations: 90.

2014 **Roy A,** Gonzalez-Gomez M, Pierani A, Meyer G*, Tole S*. Lhx2 regulates the development of the forebrain hem system. ***Cerebral Cortex*** (New York, N.Y.:1991). 2014; 24(5):1361-72. PMID: 23307637, PMCID: PMCID: PMC3977624. Citations: 78.

†2013 **Roy A,** de Melo J, Chaturvedi D, Thein T, Cabrera-Socorro A, Houart C, Meyer G, Blackshaw S, Tole S. LHX2 is necessary for the maintenance of optic identity and for the progression of optic morphogenesis. ***The Journal of Neuroscience***: the official journal of the Society for Neuroscience. 2013; 33(16):6877-84. NIHMSID: NIHMS469004, PMID: 23595746, PMCID: PMC3664457. Citations: 87.

2013 Huilgol D, Udin S, Shimogori T, Saha B, **Roy A,** Aizawa S, Hevner RF, Meyer G, Ohshima T, Pleasure SJ, Zhao Y, Tole S. Dual origins of the mammalian accessory olfactory bulb revealed by an evolutionarily conserved migratory stream. ***Nature Neuroscience****.* 2013; 16(2):157-65. PMID: 23292680, doi: 10.1038/nn.3297. Citations: 46.

2012 Harel I, Maezawa Y, Avraham R, Rinon A, Ma HY, Cross JW, Leviatan N, Hegesh J, **Roy A,** Jacob-Hirsch J, Rechavi G, Carvajal J, Tole S, Kioussi C, Quaggin S, Tzahor E. Pharyngeal mesoderm regulatory network controls cardiac and head muscle morphogenesis. ***Proceedings of the National Academy of Sciences of the United States of America*****.** 2012; 109(46):18839-44. PMID: 23112163, PMCID: PMC3503185. Citations: 89.

Peer-reviewed Book chapter:

2018 Mirzaa G, **Roy A**, Dobyns WB, Millen KJ, Hevner RF. 'Hemimegalencephaly and Dysplastic Megalencephaly'. In *Developmental Neuropathology,* 2nd edition. Edited by Adle-Biassette H, Harding BN, Golden JA. Wiley Blackwell; March 2018. https://doi.org/10.1002/9781119013112.ch5. Citations: 23.

Other scientific publications (Preprint/Invited Report/Conference Paper):

2019 **Roy A**. New mechanism driving cortical gyrification and hydrocephalus found in mice suggests scope for novel therapy. *Science X*, December 12, **2019**. [Invited report on Roy *et al.*, 2019, *eLife*: https://sciencex.com/news/2019-12-mechanism-cortical-gyrification-hydrocephalus-mice.html]

2015 **Roy A**, Ni J, Skibo J, Rankin S, Dobyns WB, Kalume F, Baker SJ, Zhao J, Millen KJ. Modeling human PIK3CA-related congenital brain overgrowth and epilepsy in mice. *International journal of developmental neuroscience*: the official journal of the International Society for Developmental Neuroscience. 2015; 47(Pt A):46. Citations: 2.

Manuscripts in preparation:

1. Vishal RL, Chowdhury S, Sharma A, **Roy A***. Early Onset Epilepsy – types, causes and perspectives *(Review)*
2. **Roy A** (as part of consortium). Spatial and cell type-related transcriptional landscape in fetal Trisomy 21 Down's syndrome patients reveal novel distinct features. *(Original Research Article)*

Editorial service

- Assistant Content Editor, *Bio-protocol* journal

Reviewer for International Journals:

- eLife
- Nature Communications
- Acta Neuropathologica Communications
- The Journal of Pathology
- Bio-protocol
- Seizure: European Journal of Epilepsy – *The official journal of Epilepsy Action*
- Frontiers in Cell and Developmental Biology
- European Journal of Neuroscience – *The official journal of the Federation of European Neuroscience Societies (FENS)*
- International Journal of Molecular Sciences
- Proceedings of the Indian National Science Academy

Teaching Experience

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR):

- **JNS-206** (3 credits): *Brain development and disorders.* Instructor, Spring 2023
  (Designed this graduate-level course, ~20 students from multiple Units took the course)
- **JNL-201** (4 credits): *Introduction to Neuroanatomy*. Co-instructor, Fall 2023 *ongoing.*
- **JNL-202** (4 credits): *Introduction to Neurobiology-I*. Co-instructor, Fall 2023 *ongoing.*

Before JNCASR:

- 2007 – 2011 *Teaching assistant*, graduate-level practical course on "Embryonic mouse brain dissection", Tata Institute of Fundamental Research, Mumbai, India
- 2011 *Instructor*, Graduate-level academic course on “Techniques in Molecular Biology/ Research Tools (DBS 1006)”, Tata Institute of Fundamental Research, Mumbai, India
- 2010 – 2013 *Volunteer Teacher*, Kendgora Adarsha Sikshayatan, Amlasole, West Bengal, India, teaching Biology, Mathematics and English to tribal children

Academic Service:

- Serving as ***Thesis committee member*** at Vellore Institute of Technology (VIT), Vellore, India
- Serving as ***PhD thesis external examiner*** at The University of Trans-Disciplinary Health Sciences and Technology (TDU), Bengaluru, India
- Served as ***MSc thesis external examiner*** at Tata Institute of Fundamental Research (TIFR), Mumbai

Research Mentoring Experience

***As Principal Investigator (at JNCASR, India)*:**

- *Graduate Student(s):* Vishal R Lolam (Int-PhD 2020 – *MS Research Report submitted in March 2023*), Yashasvi Sharma (PhD 2023)
- *Long-term Visiting intern:* Aakanksha Dharmapuri, VIT *(under JNCASR Long-term Visiting Student Programme (LVSP), Jan-June 2023)*
- *Short-term trainees:* Venkateswaran M (*under JNCASR Summer Research Fellowship Programme (SRFP), 2022*), Kunal Rajput (*JNCASR SRFP 2023*); Keerthana Ravishankar (*summer intern 2022*),
- *R&D assistants:* Shatabdi Choudhury *(Jan-Jul 2022*), NS Neeta (*Aug 2022-June 2023*), Payel Pramanik (*July-Oct 2023*), Aqsa Yashfeen (*Nov 2023 – current*)
- *Students undergone lab rotations:* Aman Sharma, Vishal R Lolam (*Int-PhD 2020*); Priyadarshini Ghosh (*Int-PhD 2021*); Asima Mishra (*Int-PhD 2022 batch*)

Before joining JNCASR, I mentored the following trainees:

***As postdoc (at SCHRI, USA)*:**

- *Undergraduates*: *Rory M. Murphy **(2017-2020)**; Kevin Z. Zhu (**2016**); Taylor Faubion (**2014**)*

As PhD scholar (at TIFR, India):

- *Postgraduates: Veena Kinare (**2010-2011**); Riyad Seervai (**2010**); Akanksha Agarwal (**2008-2010**)*

Invited/Selected Talks

2024 Manipal Genetics Update VII international event on “Cellular and Animal Models for Rare Genetic Diseases”, Manipal Academy of Higher Education (MAHE), Manipal, India, *upcoming*

2023 XLI Annual Meeting of the Indian Academy of Neurosciences and International Conference on ‘Brain: Chemistry to Cognition’, Gwalior, India

2022 MBGU-NSU Day Academic Talk, titled *“Brain Development and disorders – a beginning towards bridging gaps”,* Jawaharlal Nehru Center for Advanced Scientific Research

(JNCASR), Bengaluru, India
2022 Sci-ROI@India Virtual Launch Event, Science Showcase session, online
2021 *In-House* Symposium, JNCASR, Bengaluru, India
2021 International Scientific Meeting for PIK3CA Related Conditions, USA
2020 4th Annual Postdoc and Student Research Symposium, Seattle Children's Research Institute, Seattle, USA
2020 International online conference "Class I PI3K: disease modelling and drug targeting"
2020 Young Investigator Meeting 2020, Mahabalipuram, India
2020 Tata Institute of Fundamental Research (TIFR), Mumbai, India
2019 Hydrocephalus Association Research Workshop, St. Louis, MO, USA
2019 Washington University School of Medicine, St. Louis, MO, USA
2017 Indian Institute of Science (IISc), Center for Neuroscience, Bengaluru, India
2017 Indian Institute of Technology (IIT) Kanpur, Kanpur, India
2017 Indian Institute of Science Education and Research (IISER) Pune, Pune, India
2017 National Centre for Cell Science, Pune, India
2017 National Brain Research Centre (NBRC), Gurgaon, India
2017 TIFR Center for Interdisciplinary Sciences, Hyderabad, India
2017 Centre for Cellular and Molecular Biology (CCMB), Hyderabad, India
2015 JNCASR, Bengaluru, India
2015 Neurodevelopmental Disorders Research Consortium, Seattle, USA
2014 "Brain development and congenital neurodevelopmental disorders" symposium, Seattle, USA
2013 University College of Science & Technology, Department of Biophysics, Molecular Biology and Bioinformatics, Kolkata, India
2012 King's College London, MRC Centre for Developmental Neurobiology, London, UK
2012 University College London (UCL) Institute of Child Health, London, UK
2007 National Symposium on Current Trends in Zoological Research, Kolkata, India

Poster presentations at International Conferences

2021 23rd Biennial Meeting of the International Society of Developmental Neuroscience (ISDN2021), *online*
2020 American Epilepsy Society (AES) Annual Meeting, *online*
2020 Young Investigator Meeting 2020, Mahabalipuram, India
2018 Society for Developmental Biology 77th Annual Meeting, Portland, OR, USA
2018 Keystone Symposia Conference, State of the Brain: Genetic Dissection of Brain Circuits and Behavior in Health and Disease, Keystone, USA
2017 Cortical Development Conference 2017, Chania, Greece
2016 21st Biennial Meeting of ISDN, Juan les Pins-Antibes, France
2015 Society for Neuroscience 45th Annual Meeting 2015, Chicago, USA
2014 Joint Meeting of the 20th Biennial Meeting of the ISDN and the 5th Annual NeuroDevNet Brain Development Conference, Montreal, Canada
2012 Society for Neuroscience 42nd Annual Meeting 2012, New Orleans, USA
2012 EMBO Conference Series Morphogenesis and Dynamics of Multicellular Systems, EMBL Heidelberg, Germany
2012 19th Biennial Meeting of the ISDN, Mumbai, India

Conferences/Workshops attended

2020 Science and Research Opportunities in India (Sci-ROI) 5th Annual Event, *online*
2020 Society for Developmental Biology 79th Annual Meeting, USA, *online*
2020 The Monsoon Brain Meeting, India, *online*
2019 Society for Neuroscience 49th Annual Meeting 2019, Chicago, USA

2019	24th Summer Institute in Statistical Genetics: "Introduction To R", University of Washington, USA
2015	National Institutes of Health Professional Grant Development Workshop, Seattle, USA
2009	The Fourth Bangalore Benny Shilo Course in Developmental Biology, Bangalore, India
2008	"Model Organisms and Stem Cells in Development, Regeneration and Disease" International Symposium, Bangalore, India
2008	SERC School in Neurosciences, Nagpur, India
2007	International Conference on "Chromosomes to Neurons", Kolkata, India
2006	National Seminar on Transgenic Plants: Prometheus Unbound, Kolkata, India
2006	Annual Meeting of the Indian Biophysical Society, Kolkata, India

Other academic activities

2023	Organized academic trip for 29 trainees of JNCASR to the NIMHANS Brain Bank, along with colleague Prof Sheeba Vasu, as a part of the Neuroanatomy Course (JNS-201)
2022	Organized *"Brain Development and disorders"* demonstration table for high-school students at JNCASR on National Science Day, India
2022	Participated and interacted with the JNCASR team on GATI (Gender Advancement for Transforming Institutions) Pilot Project, initiated by the Department of Science & Technology (DST).
2013	Contributed original illustrations to book chapter "Telencephalon Patterning" by Tole S. and Hebert J. in "*Cellular Migration and Formation of Neuronal Connections: Comprehensive Developmental Neuroscience*" (2013), John Rubenstein and Pasko Rakic (Eds). Academic Press. ISBN: 978-0-12-397265-1
2010	Co-organizer, "International Speaker Seminar" series at TIFR, India under guidance of Prof. Veronica Rodrigues
2009 – 2011	Organizer and moderator, Departmental journal club at TIFR, India

In News

2015	Seattle Children's Researchers Identify Drug That Could Suppress Intractable Epilepsy https://www.newswise.com/articles/seattle-children-s-researchers-identify-drug-that-could-suppress-intractable-epilepsy
2022	Donation to the Neurodevelopment Lab of Dr Achira Roy at JNCASR to study PIK3CA brain disorders https://www.m-cm.net/blog/post/donation_to_the_neurodevelopment_lab_of_dr_achira_roy_at_jncasr
2023	New study offers hope for children suffering from intractable epilepsy. https://dst.gov.in/new-study-offers-hope-children-suffering-intractable-epilepsy
2023	Ben Barres Spotlight Awards: Announcing the winners for 2023 https://elifesciences.org/inside-elife/a3b3cf09/ben-barres-spotlight-awards-announcing-the-winners-for-2023