Neuroscience Internship

Unpublished Futuristic Focussed Areas in Neuroscience

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- **1. Cognitive Neuroscience**
  - Neural basis of attention networks
  - Working memory encoding and maintenance
  - Decision making and value-based choice circuits
  - Neural mechanisms of consciousness and awareness
  - Language processing and semantic networks
  - Executive control and cognitive flexibility
  - Multisensory integration in perception
  - Time perception and interval timing
  - Cognitive control of emotion regulation
  - Neural substrates of creativity and insight
  - Learning signals and reinforcement prediction errors
  - Metacognition and confidence monitoring
  - Neurobiology of reasoning and problem solving
  - Neural representations of numbers and magnitude
  - Spatial navigation and cognitive maps
  - Cognitive aging, resilience and brain reserve
  - Brain oscillations and cross-frequency coupling in cognition
  - Network dynamics during task switching and multitasking
  - Neuromodulators for cognitive enhancement strategies
  - Digital biomarkers for early cognitive impairment
- **2. Systems and Circuit Neuroscience**
  - Mapping microcircuits in sensory and motor systems
  - Cell-type specific connectivity atlases
  - Optogenetic dissection of functional circuits
  - In vivo calcium imaging of population activity
  - Closed-loop perturbation of neural ensembles
  - Thalamocortical and corticocortical communication channels
  - Recurrent circuitry underlying pattern completion
  - Basal ganglia loops in action selection
  - Cerebellar contributions to cognition and motor learning

- Hippocampal circuits for episodic memory
- Brainstem networks for arousal and sleep–wake control
- Neuromodulatory systems (dopamine, serotonin, acetylcholine)
- Oscillatory coordination across distant brain regions
- Criticality and phase transitions in neural networks
- Microcircuit correlates of pathological oscillations
- Cell-type specific transcriptomic and electrophysiological coupling
- Inhibitory interneuron diversity and circuit computation
- Network resilience and redundancy in brain systems
- Multi-scale models linking synapses to whole-brain dynamics
- Circuit-level signatures of neuropsychiatric disorders

- **3. Cellular and Molecular Neuroscience**
  - Ion channelopathies and neuronal excitability disorders
  - Synaptic vesicle trafficking and release machinery
  - Dendritic integration and local protein synthesis
  - Activity-dependent gene expression programs
  - Epigenetic regulation in neuronal function and memory
  - Neurotrophic factor signaling and survival pathways
  - Axonal transport defects in disease models
  - Glial cell biology: astrocytes, microglia and oligodendrocytes
  - Neuroinflammation and immune–brain cross-talk
  - Mitochondrial dynamics and neuronal energy metabolism
  - Oxidative stress and neuroprotection strategies
  - Synapse formation, elimination and maintenance
  - Receptor trafficking and synaptic plasticity mechanisms
  - RNA editing and alternative splicing in neurons
  - Non-coding RNAs in neural development and disease
  - Protein aggregation and proteostasis in neurodegeneration
  - Blood–brain barrier structure and transport mechanisms
  - Neuroendocrine signaling and hormonal modulation of brain
  - Organoid and stem cell models of neural tissue
  - Gene-editing approaches for neurological disorders
- **4. Developmental and Plasticity Neuroscience**
  - Neurogenesis and neural stem cell niches
  - Axon guidance and topographic map formation
  - Synaptogenesis during critical developmental windows
  - Experience-dependent refinement of sensory circuits
  - Critical periods in visual, auditory and social systems
  - Myelination and white-matter maturation trajectories
  - Neural crest development and peripheral nervous system wiring
  - Developmental neurotoxicity and environmental exposures
  - Perinatal brain injury and repair mechanisms
  - Hebbian and homeostatic plasticity in developing networks
  - Structural plasticity of dendritic spines and axonal boutons
  - Adult neurogenesis in hippocampus and olfactory bulb
  - Plasticity of inhibitory circuits and excitation–inhibition balance

    - Cross-modal plasticity in sensory deprivation
    - Rehabilitation-driven plasticity after brain injury
    - Computational models of developmental wiring rules
    - Neurodevelopmental disorders and circuit miswiring
    - Long-term memory consolidation and systems-level reorganization
    - Sleep-dependent plasticity and synaptic homeostasis
    - Lifespan changes in plasticity and learning capacity
- **5. Computational and Theoretical Neuroscience**
    - Biophysically detailed neuron and network models
    - Spiking neural network simulations of cortical circuits
    - Bayesian brain and predictive coding frameworks
    - Reinforcement learning models of behavior and dopamine
    - Attractor network models of working memory
    - Population coding and neural manifold analysis
    - Information theory applied to neural activity patterns
    - Dynamical systems analysis of neural oscillations
    - Mean-field and field-theoretic approaches to brain dynamics
    - Computational models of decision making and confidence
    - Biologically inspired deep learning architectures
    - Synaptic plasticity rules and learning algorithms
    - Network motifs and functional circuit design principles
    - Multi-scale modeling from ion channels to behavior
    - Computational psychiatry and mechanistic disease models
    - Inverse modeling and parameter estimation for neural data
    - Theory of consciousness and global workspace models
    - Optimal control and brain-inspired robotics
    - Neuromorphic computing based on neural principles
    - Benchmark datasets and reproducible model comparison
- **6. Neuroimaging and Brain Mapping**
    - High-resolution structural MRI and cortical parcellation
    - Functional MRI for task-based and resting-state networks
    - Diffusion MRI and white-matter connectome reconstruction
    - Magnetoencephalography and electroencephalography analytics
    - Multimodal imaging pipelines combining MRI, EEG and PET
    - Ultra-high-field MRI for laminar and columnar mapping
    - Quantitative MRI for myelin, iron and microstructure
    - Advanced PET tracers for neurotransmitter systems
    - Optical imaging and two-photon microscopy in animal models
    - Whole-brain light-sheet imaging and clearing methods
    - In vivo calcium and voltage imaging analysis workflows
    - Standardized brain atlases and coordinate frameworks
    - Connectomics and graph analysis of brain networks
    - Machine learning for lesion–symptom and lesion–network mapping
    - Real-time neuroimaging for neurofeedback and closed-loop control
    - Imaging biomarkers for early neurodegenerative detection
    - Longitudinal brain mapping across development and aging

- Cross-species brain mapping and comparative neuroanatomy
- Cloud-based pipelines for large-scale neuroimaging datasets
- Quality control and harmonization across imaging sites

- **7. Neuroengineering and Brain–Machine Interfaces**
  - Invasive brain–computer interfaces for motor restoration
  - Non-invasive BCIs using EEG, MEG and fNIRS
  - Neuroprosthetic control of limbs and exoskeletons
  - Bidirectional interfaces with sensory feedback
  - Closed-loop deep brain stimulation systems
  - Spinal cord stimulation for movement recovery
  - Retinal and cochlear neuroprosthetic technologies
  - Flexible and bio-compatible neural electrode arrays
  - Wireless neural recording and telemetry systems
  - Neural decoding algorithms for high-dimensional control
  - Real-time artifact removal and signal enhancement
  - Neuromodulation for pain, mood and cognitive disorders
  - Vagus nerve and peripheral nerve stimulation approaches
  - Miniaturized implantable devices and power solutions
  - Neuroethics and regulatory aspects of neural devices
  - Hybrid human–AI systems for augmenting cognition
  - Neural interfaces for communication in locked-in patients
  - Robotic platforms for testing closed-loop neural controllers
  - Digital twins of neural implants and device–tissue interaction
  - Standards and safety in neuroengineering trials
- **8. Neuroinformatics, Big Data and AI**
  - Curated repositories for electrophysiology and imaging data
  - Standard data formats and ontologies in neuroscience
  - Automated pipelines for preprocessing neural recordings
  - Deep learning for spike sorting and cell classification
  - Graph neural networks for connectome analysis
  - Self-supervised learning on large-scale brain datasets
  - AI-based segmentation of cells and brain structures
  - Natural language processing of neuroscience literature
  - Knowledge graphs linking genes, circuits and behavior
  - Cloud-native platforms for collaborative data analysis
  - Reproducible workflows and containerized analysis pipelines
  - Privacy-preserving analytics for clinical brain data
  - AI-assisted experimental design and hypothesis generation
  - Automated quality control for multimodal datasets
  - Benchmark challenges and open competitions in neuro-AI
  - Explainable AI for clinical decision support in neurology
  - Digital biomarkers from wearable and smartphone data
  - Standards for FAIR (Findable, Accessible, Interoperable, Reusable) brain data
  - Interoperable dashboards for visual analytics of brain signals
  - Integration of omics, imaging and behavioral datasets
- **9. Translational, Clinical and Precision Neuroscience**

- Biomarker discovery for neurodegenerative disorders
- Stratification of patients using multimodal brain data
- Neuroimaging-guided neurosurgical planning
- Predictive models for epilepsy surgery outcomes
- Stroke imaging, penumbra modeling and recovery trajectories
- Traumatic brain injury prognosis and rehabilitation planning
- Neuroimmunology in multiple sclerosis and related disorders
- Movement disorder circuits and neuromodulation targets
- Translational frameworks for psychiatric neuroscience
- Computational phenotyping of depression, anxiety and psychosis
- Precision dosing and pharmacokinetics in neuropharmacology
- Clinical trials design for neuromodulation and device therapies
- Cognitive remediation and digital therapeutics for brain disorders
- Neurorehabilitation using VR, robotics and gamified training
- Sleep disorders and circadian rhythm neurology
- Headache, migraine and pain network neuroscience
- Neuro-oncology imaging and cognitive outcome prediction
- Genetic counseling and risk prediction for brain diseases
- Ethical, legal and social issues in clinical neuroscience
- Healthcare data integration for learning health systems in neurology

- **10. Social, Affective and Decision Neuroscience**
  - Neural circuits for emotion generation and regulation
  - Reward processing and valuation in the brain
  - Neurobiology of stress, resilience and coping
  - Empathy, theory of mind and mentalizing networks
  - Social decision making and norm compliance
  - Neuroeconomics of risk, reward and uncertainty
  - Morality, fairness and ethical judgment in the brain
  - Attachment, bonding and caregiving systems
  - Neural mechanisms of addiction and habit formation
  - Affective forecasting and intertemporal choice
  - Personality traits and stable network configurations
  - Neuropolitics and collective behavior dynamics
  - Cultural neuroscience and cross-cultural brain differences
  - Placebo, nocebo and expectation-driven brain responses
  - Social learning, imitation and observational conditioning
  - Neural signatures of loneliness and social isolation
  - Sex differences and gender influences in brain function
  - Real-world affect sensing with wearables and mobile signals
  - Brain responses to music, art and aesthetic experiences
  - Ethical implications of modulating social and affective processes

Contact Via Whatsapp on +91-7993084748 for Fee Details

Apply

Internship Fee Structures			
Duration	**Academic Mode**	**Technical Mode**	**Research Mode**
5 Days	Rs 3750	Rs 6000	Rs 9000
10 Days	Rs 4500	Rs 6750	Rs 9750
15 Days	Rs 4950	Rs 7200	Rs 12000
20 Days	Rs 6750	Rs 9000	Rs 15000
30 Days	Rs 7500	Rs 10500	Rs 19500
45 Days	Rs 9000	Rs 12000	Rs 22500
2 Months	Rs 10500	Rs 13500	Rs 27000
3 Months	Rs 12000	Rs 22500	Rs 34500
4 Months	Rs 18000	Rs 28500	Rs 42000
5 Months	Rs 22500	Rs 31500	Rs 49500
6 Months	Rs 27000	Rs 36000	Rs 54000
7 Months	Rs 28500	Rs 40500	Rs 64500
8 Months	Rs 31500	Rs 45000	Rs 72000
9 Months	Rs 36000	Rs 52500	Rs 82500
10 Months	Rs 43500	Rs 60000	Rs 97500
11 Months	Rs 48000	Rs 67500	Rs 112500

1 Year	Rs 57000	Rs 75000	Rs 142500
18% additional GST on all fee structures.			
Installment options are available for all durations.			

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Deliverables	Academic Mode	Technical Mode	Research Mode
Certification	✓	✓	✓
Hands-On Practical Exposure	✓	✓	✓
Thesis	✓	✘	✓
PowerPoint Assistance	✓	✓	✓
Protocol Repetitions	✘	✓	✓
Publication Coauthorships	✘	✘	3 Months Duration onwards
References	✘	✓	✓
Recommendations	✘	✘	✓
Experience Letters	✘	✘	6 Months Duration Onwards

Placement Assistance	✘	✘	**6 Months Duration Onwards**
Placement Guarantee	✘	✘	**1 Year Duration**

Offline Locations

Hyderabad

Cherlapalli IDA, 500051 Chennai

Parrys Corner, 600001 Bangalore

Jalahalli, Bahubali Nagar Kochi

Aroma Gardens, Beside Townhall Metro Visakhapatnam

Address will be updated in few days Bhubaneswar

Address will be updated in few days Kolkata

Address will be updated in few days Patna

Address will be updated in few days Lucknow

Address will be updated in few days Chandigarh

Address will be updated in few days Jaipur

Address will be updated in few days Ahmedabad

Address will be updated in few days Indore

Address will be updated in few days Dallas

825 Watters Creek Blvd, Allen

Contact Us for further queries

Offline Timetable

3 - 5 Hours per day | 4 Days Practicals / week | 1 Day Reporting

Weekly Schedule

Tuesday to Friday: Practical Sessions
Saturday: Documentation Day
Sunday & Monday: Weekend Holidays

Lab Working Hours

9:30 AM to 5:30 PM

Students/Scholars are assigned **3 to 5 hours/day** based on their protocols.

Online Mode Workflow

2 to 4 hours per day as per discussed with NTHRYS Management before booking the slot.

All activities (Online / Virtual and Offline) are managed through the **NTHRYS Project Dashboard System** — a web portal designed exclusively to facilitate, guide, and track your progress throughout each phase.

Phase 1: Topic / Title Finalization

Guided assistance in selecting and refining your research topic or project title within the dashboard interface.

Phase 2: Research Methodology Finalization

Step-by-step guidance in defining objectives, research questions, and methodology using interactive templates and mentor feedback on the dashboard.

Phase 3: Software, Tools, and Statistical Approaches

Installation assistance, tool demonstrations, and access to recommended software provided via the dashboard with mentor instructions and documentation.

Phase 4: Task Execution

Students/scholars execute research tasks on their own systems while mentors monitor and guide progress through the dashboard system.

Phase 5: Results Analysis

Data analysis, results review, and interactive discussions are facilitated through dedicated dashboard modules ensuring research integrity.

Phase 6: Documentation

Proper documentation of results, methodology, and conclusions using dashboard templates, ensuring consistency and completeness.

No Video Calls, No Theory Classes: All learning is task-based, with hands-on execution by students/scholars under the guidance of mentors using the **NTHRYS Project Dashboard System**.

Click Here to know schedule, offline locations, calendar,

modes of operation etc.,

Important Note
Note 1: Candidates may select any one of the focused areas listed for their internship. **Note 2: Fundamental concepts are provided as guidance for candidates who require them; however, candidates may choose to bypass these sections if desired.** **Note 3: All candidates will gain practical, hands-on experience with every step outlined in the provided methodology.** **Note 4: Comprehensive placement assistance and career guidance will be available to all candidates during and after the internship.** **Note 5: We understand that many students may lack basic practical exposure due to shortcomings in their college education. This is not the fault of the students but rather a failure of the institutions and their staff. At NTHRYS, our staff excel at training every student from the ground up, ensuring they gain the necessary skills and experience.**