



# Brain Matters: Resources for Researchers in the Neurosciences

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# Science and Technology Resources on the Internet

## Brain Matters: Resources for Researchers in the Neurosciences

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### Introduction

"It is essential to understand our brains in some detail if we are to assess correctly our place in this vast and complicated universe we see all around us."-- Francis Crick, *What Mad Pursuit* (1988).

The study of neurobiology, or neuroscience, is vitally important to our understanding of ourselves and the world around us. New ways of studying the brain are constantly uncovering surprising insights. For instance, Functional Magnetic Resonance Imaging (fMRI) and Positron Emission Tomography (PET) scans allow scientists to see what is happening in the brain, and techniques such as Brainbow can map individual neurons. This webliography is aimed at librarians working in the biomedical and life sciences, who can facilitate access to online

resources and data for their patrons while at the same time keep up with new developments in neurobiology.

*ISTL* first published a webliography on the subject in 2006 (see: [Mapping the Brain](#)), but much has changed in the intervening years. As with the original webliography, included are free web resources selected based on the following criteria:

- **Authority:** web sites are published and maintained by research institutions, science laboratories, scholarly organizations, scientific societies, or experts in the field.
- **Content:** the web sites provide access to scholarly, current, and free information and do not require memberships and/or registrations. The webliography excludes any subscription-based journals and databases.
- **Audience:** although a couple of the sites listed also have resources for the general public, the emphasis is on scholarly research in neuroscience.

There are many more free web sites of interest, with more always being developed, so this list can never be exhaustive. In addition, more research results are being made freely available, whether in institutional repositories, as open access articles, or as datasets. It is important for librarians working with neuroscience researchers to keep up with developments in the field and to assist their patrons with finding current, quality resources.

## Databases

### PubMed

<http://www.ncbi.nlm.nih.gov/pubmed/>

PubMed is a database created and maintained by the National Center for Biotechnology Information (NCBI), a division of the National Library of Medicine (NLM) at the National Institutes of Health (NIH). PubMed now includes over 24 million citations in the biomedical literature in

MEDLINE, life science journals, and online books, dating back to 1966.

### **National Center for Biotechnology (NCBI) databases**

<http://www.ncbi.nlm.nih.gov/guide/all/>

There are a number of other resources from NCBI that have material relevant for neuroscientists. The NCBI databases are all listed at <http://www.ncbi.nlm.nih.gov/guide/all/#databases> .

## **Current Journals**

### **PubMed Central (PMC)**

<http://www.ncbi.nlm.nih.gov/pmc/>

PubMed Central is the repository for many articles funded by NIH, the National Science Foundation (NSF), and other funding agencies. It includes many items from PubMed, with more being added constantly since researchers receiving funds from these entities are required to deposit their work in PMC after 6 months, if not before.

### **BioMed Central (BMC): Neuroscience, Neurology and Psychiatry Gateway.**

<http://www.biomedcentral.com/gateways/neuropsych>.

BioMed Central is an Open Access (OA) publisher, and a few of their journals cover neurobiology. The Neuroscience, Neurology and Psychiatry Gateway highlights the latest articles BMC has published on these topics. It is continually updated so it is worthwhile for interested researchers to bookmark.

## **Digital Journal Archives**

### **The Medical Heritage Library**

<http://www.medicalheritage.org/>

The Medical Heritage Library is a digital collaborative among some of the world's leading medical libraries that provides free and open access

to many quality historical medical resources. It includes relatively recent reports from organizations and conferences on neurobiology as well as older materials such as the neuroanatomical work of Nobel laureate Santiago Ramón y Cajal.

### ***Neuron*: Cell Press**

<http://www.cell.com/neuron/archive>

Cell Press is a leading publisher of biomedical literature. They offer free access to the online archive of its journals, including the important journal *Neuron*.

### **Cognitive Sciences E-print Archive (CogPrints)**

<http://cogprints.org/>

CogPrints is an electronic self-archive for "anything pertinent to the study of cognition," including papers in any area of psychology and neuroscience.

### **Highwire Press**

<http://home.highwire.org/>

Highwire Press has about 1,700 journals and thousands of scholarly books, as well as a free, searchable archive of more than 2,344,000 free full-text articles. The publishers include the American Academy of Neurology (*Neurology*), Sage (*Therapeutic Advances in Neurological Disorders*), and the Society for Neuroscience (*Journal of Neuroscience*), among others of interest.

### **Proceedings of the National Academy of Sciences (PNAS)<**

<http://www.pnas.org/content/by/year>

This important peer-reviewed journal has a free online archive. Within each issue, Neuroscience is one of the topics under Biological Sciences, giving researchers quick access to items of interest. Some articles are available immediately.

## **Web sites**

## **Human Brain Project (HBP)**

<https://www.humanbrainproject.eu/>

HBP is a global collaborative effort sponsored by the European Commission to integrate international neuroscience data using modern supercomputer technologies. It involves "(h)undreds of scientists, 112 institutions, 24 countries, 12 research areas." One of their objectives is to develop six Information and Computing Technology (ICT) platforms -- Neuroinformatics, Brain Stimulation, High Performance Computing, Medical Informatics, Neuromorphic Computing, and Robotics -- and a Unified Portal providing a single point of access to these.

## **Neurosciences on the Internet: Best Bets**

<http://www.neuroguide.com/bestbets.html>

This web site is a portal to multiple neuroscience web sites, ranging from PubMed and the NCBI Entrez databases, to journals, to compilations of web sites on a variety of neuroscience topics.

## **The Center for Brain Science (CBS)**

<http://cbs.fas.harvard.edu/>

Researchers associated with CBS work on the structure and function of neural circuits. Members are drawn from the Harvard Faculty of Arts and Sciences, the Department of Neurobiology at the Harvard Medical School, the School of Engineering, and the Harvard-affiliated hospitals. Among other projects, Center researchers Jeff Lichtman and Joshua Sanes developed the **Brainbow technique**, a genetic method for labeling individual nerve cells in the brain to track connections in the brain.

## **Clinical Neurophysiology on the Internet**

<http://www.neurophys.com/>

This web site is designed for neurophysiologists working in clinical settings to exchange information on diagnostics, intraoperative monitoring, etc; it also provides technical and study resources for medical students.

## **Neuroscience Information Framework**

<http://neuinfo.org/>

This web site is an initiative of the NIH Blueprint for Neuroscience Research (<http://neuroscienceblueprint.nih.gov/>), which enables access to an inventory of web-based neuroscience resources including data, materials, and tools.

## **BrainInfo**

<http://braininfo.rprc.washington.edu/>

This web site is aimed at identifying structures in the brain. You can search by name of the structure; by location in an atlas of the macaque brain (there are atlases for two species of *Macaca*); or you can map or display mouse or macaque brain data in NeuroMaps. The Tools and Methods section contains ontologies of human, macaque, and rodent brain atlases, and downloadable templates.

## **Clinical Trials**

<http://www.clinicaltrials.gov>

This National Library of Medicine site lists federally and privately supported research in human volunteers, including almost one hundred projects under the [general heading of Neuroscience](#).

## **Center for Morphometric Analysis**

<http://www.cma.mgh.harvard.edu/>

A project of Harvard Medical School and Massachusetts General Hospital, this web site includes links to sections on Brain Segmentation in MRI (<http://www.cma.mgh.harvard.edu/seg/>); the Internet Brain Segmentation Repository (IBSB) (<http://www.nitrc.org/projects/ibsr>); and other tools for professionals.

## **The Brain Observatory at the University of California -- San Diego**

<http://thebrainobservatory.org/>

This site includes the Digital Brain Library Project; its purpose is to archive and image the brains of hundred of people, along with details of their personal histories. They began with the brain of Patient H.M., who

had parts of his brain surgically removed in order to relieve his severe epilepsy. The knowledge gained from studies of Patient H.M. helped scientists make connections between the brain and memory.

### **The Brain From Top To Bottom, McGill University**

<https://www.mcgill.ca/brain/resources/brain-top-bottom>

This is a collaboration of institutes around McGill and their partners around the world, including the University of Oxford, Imperial College London, and the Neuroscience Center of Zurich. Brain From Top To Bottom covers various aspects of how the brain works, and with Beginner, Intermediate and Advanced tabs for different levels of users.

### **Senselab**

<http://senselab.med.yale.edu/>

A project to build integrated, multidisciplinary models of neurons and neural systems, Senselab was founded in 1993 as part of the original Human Brain Project. It is now part of the Neuroscience Information Framework ([NIF](#)) and the International Neuroinformatics Coordinating Facility ([INCF](#)). It takes "novel informatics approaches to constructing databases and database tools for collecting and analyzing neuroscience information, using the olfactory system as a model, with extension to other brain systems." It contains ten related databases that fall into three categories: Neuronal, Olfactory, and Disease.

## **Research Organizations**

### **The BRAIN Initiative, National Institutes of Health**

<http://www.braininitiative.nih.gov/index.htm>

Announced by President Obama in 2013, Brain Research through Advancing Innovative Neurotechnologies (BRAIN) aims at "revolutionizing our understanding of the human brain." Because of the scope of the initiative, achieving its goals requires collaboration among many different disciplines and sectors. NIH is working with other federal agencies and with private partners to provide funding for this



initiative.

### **The National Institute of Mental Health (NIMH), National Institutes of Health**

<http://www.nimh.nih.gov/index.shtml>

This web site has information on many mental health related subjects, from specific health topics to funding opportunities to research priorities to outreach and more.

### **The National Institute of Neurological Disorders and Stroke (NINDS), National Institutes of Health**

<http://www.ninds.nih.gov/>

This web site has links to research programs, funding information, disorders A-Z, and more.

### **Neuroscience @ NIH**

<http://neuroscience.nih.gov/>

This web site describes the neuroscience research being conducted at NIH, including: biophysics, molecular and cellular neurobiology, synapses and circuits, neuronal development, integrative neuroscience, brain imaging and both neurological and psychiatric disorders.

### **The Society for Neuroscience (SfN)**

<http://www.sfn.org/>

A professional organization "committed to advancing the understanding of the brain and nervous system," SfN publishes the *Journal of Neuroscience*; holds an annual meeting; promotes professional development, outreach and advocacy; and offers funding and awards. It is the largest organization in the world of scientists and physicians working in the neurosciences.

### **The Federation of European Neuroscience Societies (FENS)**

<http://www.fens.org/>

The "voice of European neuroscience," this is a professional organization that is the equivalent of the American-based [Society for](#)

[Neuroscience.](#)

## **Atlases**

An atlas is usually regarded as a collection of maps, or of illustrations related to a particular subject. Brain atlases are as essential for neuroscientists as maps are for geographers. Electronic atlases are flexible and customizable and include images, maps of various parts of the brain and data; many of them interactive.

### **The Whole Brain Atlas**

<http://www.med.harvard.edu/aanlib/home.html>

This atlas includes images of human brains, including normal brains and brains with various conditions such as cerebrovascular, degenerative, neoplastic, and inflammatory diseases.

### **Atlas of the Human Brain**

[http://www.thehumanbrain.info/about\\_us.php](http://www.thehumanbrain.info/about_us.php)

From Heinrich-Heine Universität in Germany, this atlas is interested in the function and dysfunction of the brain through comparative and developmental anatomy, study of brains affected by various diseases, and expression and regulation of glycoconjugates during development.

### **The Digital Anatomist**

<http://www9.biostr.washington.edu/da.html>

Interactive atlas of the human brain, with 2D and 3D scans from cadaver dissections, MRI scans, and computer reconstructions.

### **The High Resolution Mouse Brain Atlas**

<http://www.hms.harvard.edu/research/brain/>

Mice are important and widely used in neuroscience research, and the Mouse Brain Atlas is also important in helping scientists develop ways to better image human brains as well.

# Online Courses and Textbooks

## **Neuroscience Online, University of Texas Houston Medical School**

<http://neuroscience.uth.tmc.edu/>

An electronic open access textbook.

## **Brain and Cognitive Sciences, Massachusetts Institute of Technology**

<http://ocw.mit.edu/courses/brain-and-cognitive-sciences/>

A Massively Open Online Course (MOOC)

## **Fundamentals of Neuroscience, Harvard University**

<https://www.edx.org/course/harvardx/harvardx-mcb80-1x-fundamentals-3136#.VCMuHOfB3gw>

A Massively Open Online Course (MOOC).

# Popular Web Sites

## **Brain Awareness Week**

<http://www.dana.org/BAW/>

Brain Awareness Week is held annually in March to increase public awareness of the importance of brain research. The web site provides information on planning events, as well as for links to various publications and reports. It's geared to the public but invites partners to plan and post events, and provides resources to assist them to share best practices and innovative activities.

## **The Harvard Mahoney Institute**

<http://hms.harvard.edu/hmni>

The Harvard Mahoney Institute was founded to educate the public on the latest scientific discoveries about the brain, and how these discoveries are relevant in their daily lives, as well as to support young neuroscientists through fellowships for Harvard Medical School. They

publish a Newsletter titled *On the Brain*.

### **Cognitive and Emotional Health Project: The Healthy Brain**

<http://trans.nih.gov/CEHP/>

An NIH initiative involving the National Institute on Aging (NIA), the National Institute on Mental Health (NIMH), and NINDS. It is aimed at the cognitive health of people as they age. The site provides review documents on cognitive and emotional health, social factors, and biomedical and physiological factors. A [questionnaire](#) gathers information from large-scale longitudinal and epidemiological studies of cognitive and emotional health, and responses to the questionnaire are being entered into a searchable database available to investigators.

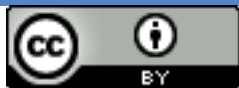
### **BrainFacts.org**

<http://www.brainfacts.org/>

A public information initiative of The Kavli Foundation, the Gatsby Charitable Foundation, and the Society for Neuroscience, BrainFacts.org is a resource on brain research for the general public, policymakers, educators, and students of all ages. It includes Educator Resources, with a variety of videos, booklets, etc. Brain Basics includes neuroanatomy, development, cell communication, neural network function, and evolution. A section on Sensing, Thinking, and Behaving covers perception, learning and memory, sleep, awareness and attention, and more. Another tab has information on various categories of disorders including immune system disorders, injury, etc., and an A-Z list of neurological disorders.

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