**NITRC Three Services**

- The “go to” collaboration environment enabling the distribution, enhancement, and adoption of neuroinformatics resources: MR, CT, PET/SPECT, EEG/MEG, imaging genomics, optical imaging, clinical neuroinformatics, computational neuroscience

- Curated repository of DICOM and NIfTI-1 images searchable by metadata such as handedness, gender and group, NIF Tier 3 registered, certain datasets on both NITRC-IR and their listed NITRC project
  - 1000 Functional Connectomes (resting state), ABIDE (resting state), CANDIShare (T1 & manual segmentations); ADHD 200 (resting state); Beijing Enhanced DTI, Beijing Eyes Open Eyes Closed, Beijing Short TR; (diffusion data), INDI NKI/Rockland (resting state), PING (structural, diffusion & resting state)

- From researchers executing data processing via cloud-based workflow tools (such as best-of-breed neuroimaging workflows or pipelines)
  - Easy to access and use system with large pipeline and good computational resources both AWS and platform-independent
Impact on End Users

- **Faculty:** Use NITRC to point to software and data (theirs as well as others’) for their courses

- **Students:** Use NITRC’s community forums and other resources to get a feel for the neuroimaging community as a whole; Can study pros and cons of multiple existing potential solutions; Easy access to existing solutions

- **Experienced Users:** Optimize processing options by upgrading techniques and mixing and matching methods

- **See Our Testimonials on nitrc.org**
  
  - [I] needed a solution that would quickly and reliably conduct image processing for Parkinson’s research. [I] found the NITRC Computational Environment (NITRC-CE) on AWS Marketplace, reducing time required to process neuroimaging data by 85%....allow[ing] me to complete a critical stage of my research in 2 days, instead of 2 weeks.
  
  - [NITRC] has greatly reduced the cost of managing [our] software development, and it has been an incredible resource for sharing resources with collaborators around the world.
Accelerating Scientific Progress
- NITRC has become the first choice for neuroscience researchers to find neuroimaging tools and share data and resources (1000 functional connectomes)
- Labs spend less time searching for and developing lab-specific software
- Universities rely on NITRC’s services, storage, and uptime
- Time and resources are redirected towards basic research

Optimizing Techniques
- Mixing and matching best-of-breed tools promotes maximum power to detect biological signals

Promoting Reproducible Science
- Community access to data and tools
- Independent confirmation and strengthened impact of results

NIH and Other Neuroscience Initiative Interoperability
- NIF, Biositemaps, and INCF
Saves Valuable Research Time
- Researchers saved time searching the Internet or developing redundant tools by finding the right neuroimaging tools on NITRC due to its search structure, meta-tags, ratings and reviews, and developer contact database

Useful for Research
- Researchers found neuroimaging tools on NITRC for use in their research and have published as a result

Saves Infrastructure Funds
- By using NITRC infrastructure for tool development, collaboration, or distribution, lab chiefs save money and time, thus redirect those finite resources to research
- the NITRC community collaborates internationally and across university and institute lines
Web Trends

Monthly Stats based on 3Q14
- 22,099 sessions
- 12,025 users
- 81,284 pageviews
- 3.68 pages/visit
- 3 min. and 39 sec. avg. time on site
- 46.3% new visitors
- Demographics: 34% US, 7.9% China, 6% UK, Germany, 5% Canada, 4% Japan, 3% Italy, India, Australia

Annual
- 282,505 sessions
- 142,449 users
- 1 million pageviews

Since July 2009 (5.5 years)
- 1 million sessions, 460,722 users, 4.2 million pageviews, 4.1 pages/visit, 3:42 avg. time on site
- 10,733 registered users
- 718 publicly listed software tools and resource projects
- 2.41 million software and data downloads
Screen Shots of NITRC-R
NITRC-IR and NITRC-CE
About NITRC

NIH funded the knowledge management website, Neuroimaging Tools and Resources Clearinghouse (NITRC.org), to allow researchers to develop, share, and collaborate on software tools with the goal of eliminating duplicate funding for parallel research efforts. NITRC’s Computational Environment (NITRC-CE) allows researchers to use Amazon’s Elastic Compute Cluster (EC2) to compute against the federated data in NITRC’s Image Repository or their own research data. Neuroscientists can quickly derive results by using our virtualized computing platform pre-configured with popular analysis tools and built on the NeuroDebian operating system.

NITRC

Visit the NITRC Website

NITRC Products (2)

NITRC Computational Environment

⭐⭐⭐⭐⭐ (3) | Version v0.30-all regions | Sold by NITRC

Free Tier Eligible

$0.00/hr for software + AWS usage fees

NITRC-CE is a virtual computing platform pre-configured with many neuroimaging data analysis applications. NITRC-CE joins the family of successful NITRC services starting ...

Linux/Unix, Ubuntu 12.04 | 64-bit Amazon Machine Image (AMI)

NITRC Computational Environment for Cluster Compute Instances

Version v0.30 CC | Sold by NITRC

$0.00/hr for software + AWS usage fees

NITRC-CE for Cluster Compute Instances provides the same virtual computing platform for neuroimaging data analysis as NITRC-CE but on high performance computing machines ...

Linux/Unix, Ubuntu 12.04 | 64-bit Amazon Machine Image (AMI)
NITRC Computational Environment
Sold by: NITRC

NITRC-CE is a virtual computing platform pre-configured with many neuroimaging data analysis applications. NITRC-CE joins the family of successful NITRC services starting with the flagship, NITRC-Resources, the “go-to” place for neuroimaging tools and resources. NITRC Image Repository offers a select set of community-generated neuroimaging data sets, while this service, NITRC Computational Environment, offers the convenience of cloud-based computing against NITRC-IR data sets or your data sets. We welcome any suggestions on how to improve this service to make it a user friendly tool for... Read more

Customer Rating ★★★★★ (3 Customer Reviews)

Latest Version v0.30—all regions (Other available versions)

Base Operating System Linux/Unix, Ubuntu 12.04

Delivery Method 64-bit Amazon Machine Image (AMI) (Learn more)

Support See details below

AWS Services Required Amazon EC2, Amazon EBS

Highlights

- Need resources on demand to compute against your neuroimaging data? Tired of fighting for institutional compute resources and just need to get the compute done? Use NITRC-CE!

- Need access to the most popular neuroimaging analysis tools? Each release has more of the most popular neuroimaging tools, check our User Guide for a complete listing of installed packages. Use these resources separately, or pipeline them, were agnostic!

- Need access to the most popular community-generated and curated neuroimaging analysis data sets? Access

Pricing Details

For region US East (Virginia)

Free Tier Eligible

This product can be used for free on a Micro instance for up to 750 hours per month if you qualify. See details.

Hourly Fees

<table>
<thead>
<tr>
<th>EC2 Instance Type</th>
<th>Software</th>
<th>EC2</th>
<th>EC2</th>
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<tbody>
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<td>$0.02/hr</td>
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<tr>
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<td>$0.02/hr</td>
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</table>

Total daily fees will vary by instance type and EC2 region.
NITRC Computational Environment for Cluster Compute Instances

NITRC-CE for Cluster Compute Instances provides the same virtual computing platform for neuroimaging data analysis as NITRC-CE but on high performance computing machines that offer high bandwidth, low latency networking, and very high compute capabilities. NITRC-CE joins the family of successful NITRC services starting with the flagship, NITRC-Resources, the “go to” place for neuroimaging tools and resources. NITRC Image Repository offers a select set of community-generated neuroimaging data sets, while this service, NITRC Computational Environment, offers the convenience of cloud-based computing. Read more

Customer Rating  Be the first to review this product

Latest Version  v0.30 CC

Base Operating System  Linux/Unix, Ubuntu 12.04

Delivery Method  64-bit Amazon Machine Image (AMI) (Learn more)

Support  See details below

AWS Services Required  Amazon EC2, Amazon EBS

Highlights

- Need resources on demand to compute against your neuroimaging data? Tired of fighting for institutional compute resources and just need to get the compute done? Use NITRC-CE!
- Need access to the most popular neuroimaging analysis tools? Each release has more of the most popular neuroimaging tools, check our User Guide for a complete listing of installed packages. Use these resources separately, or pipeline them, we’re agnostic!
- Need access to the most popular community-generated and curated neuroimaging analysis data sets?

Pricing Details

For region: US East (Virginia)

<table>
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<tr>
<th>EC2 Instance Type</th>
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<td>$0.00/hr</td>
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</tr>
</tbody>
</table>

EBS Storage Fees

$0.10 / GB / Month for Standard EBS Storage

Assumes On-Demand EC2 pricing; prices for Reserved and Spot

1/14/2014
Welcome to the NITRC Computational Environment (NITRC-CE), powered by NeuroDebian.

For an up-to-date listing of NITRC-CE installed packages, go to: [http://www.nitrc.org/nitrcce_packages](http://www.nitrc.org/nitrcce_packages).

Please fill out the following form to configure your NITRC-CE instance. (You may use your NITRC web site credentials, but if you then change them on the web site, they will not be automatically updated on NITRC-CE.)

Choose a username
Choose a password
Repeat password

- Let NITRC anonymously know that you have started this AMI (one time for funding purposes)
- Periodically send anonymous usage statistics (for performance and funding purposes)
- If AWS instance is left running for [ ] hour(s), send email to

Or go [here](http://www.nitrc.org) to use Amazon's billing alarm system.
Instructions

From this screen you can start a new NITRC-CE session if one is not already running, or you can connect to or end a NITRC-CE session that is already running. If you have any unsaved work in a session that is ended, it will be lost. If you are having problems connecting, try these instructions for connecting to NITRC-CE through your organization's firewall.

Start Session - Start a VNC session
Logout - Log out from NITRC-CE. (Note: This will not close your Amazon EC2 instance.)

Software License Status

AFNI Status: Installed - Freeware

Ants Status: Installed - BSD License

DTIPrep Status: Installed - BSD License

FreeSurfer Status: License not installed - FreeSurfer License
To update your FreeSurfer License, please click here.

FSL Status: Installed - FSL License

ITK-SNAP Status: Installed - GNU General Public License (GPL)

LONI Pipeline Server Status: Installed - LONI Software License

MRtrix Status: Installed - GNU General Public License (GPL)

R Status: Installed - GNU General Public License V2 (GPL V2)

Launch a Pipeline web start client configured to use this server.

For a complete list, please go to: User Guide - NITRC-CE Installed Packages
Your session has been created.

Instructions

From this screen you can start a new NITRC-CE session if one is not already running, or you can connect to or end a NITRC-CE session that is already running. If you have any unsaved work in a session that is ended, it will be lost. If you are having problems connecting, try these instructions for connecting to NITRC-CE through your organization's firewall.

Your session is currently running. You may access it by directing a VNC client to ec2-54-211-9-53.compute-1.amazonaws.com::5901 or with the "Connect" button below.

By connecting to the server, you agree to the licenses of the software listed below.

- Connect - Connect to your existing session.
- End Session - End your existing session.
- Logout - Log out from NITRC-CE. (Note: This will not close your Amazon EC2 instance.)

Software License Status

AFNI Status: Installed - Freeware
Ants Status: Installed - BSD License
DTIPrep Status: Installed - BSD License
FreeSurfer Status: License not Installed - FreeSurfer License
   To update your FreeSurfer License, please click here.
FSL Status: Installed - FSL License
ITK-SNAP Status: Installed - GNU General Public License (GPL)
LONI Pipeline Server Status: Installed - LONI Software License
Configure StarCluster

- Python installer
- Runs on any local environment (Mac, Linux, Windows)
- Simple command line interface well documented

- [http://star.mit.edu/cluster/docs/latest/index.htm](http://star.mit.edu/cluster/docs/latest/index.htm)
- Verify StarCluster working via the AWS console
Cluster Running

- StarCluster at work!
- Next task to add neuroimaging software applications
1. **Plain Vanilla VMWare Ubuntu 12.04** (i.e., preparing to run our script)

2. **VMware Player**
Sample Views: FSL, FreeSurfer, AFNI
Bayesian Estimation of Diffusion Parameters Obtained using Sampling Techniques. Runs Markov Chain Monte Carlo sampling to build up distributions on diffusion parameters at each voxel necessary for running probabilistic tractography.

- **Data:** DTI, 2.5mm$^3$ spatial resolution, 32 diffusion directions, $b=1000$, 60 axial slices, acquisition time 6 min), TR = 9s, TE = 35ms
- **Parallelization:** FSL automatically distributes ‘bedpostx’ into “per slice” jobs and queues them to the SGE. (60 jobs in this case)
FSL ‘bedpostx’ example - Processing Time: 5 hours 54 minutes (354 minutes) on 1 core desktop Mac…

- m1.small, 1 Core, 2 EC2-PU
  $0.06/hour, 450 min, $2.00

- cc2.8xlarge, 16 Cores, 88 EC2-PU
  $3.06/hour, 20 min, $3.06
**FSL ‘VBM’**
- **Data:** 103 subjects T1
- **Parallelization:** FSL will automatically parse the template registration steps into ‘per subject’ jobs and submit to SGE
- **Processing Time:**
- **m1.8xlarge (8 cores)**
- **Cost:** $20.00

**Freesurfer**
- **Data:** ABIDE MPRAGE subjects
- **Parallelization:** None per subject, but can run a subject per instance/core for simultaneous execution on a population

<table>
<thead>
<tr>
<th>Cost/hr</th>
<th>0.24</th>
<th>0.6</th>
<th>0.45</th>
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<tr>
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<td>4</td>
<td>32</td>
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<td>m3.xlarge</td>
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<td>10:33</td>
<td>9:50</td>
<td>10:33</td>
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<tr>
<td>Total cost per case</td>
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<td>6.6</td>
<td>4.5</td>
<td>26.4</td>
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<tr>
<td>concurrent cost per case</td>
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<td>8</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>cost per case</td>
<td>4.2</td>
<td>0.825</td>
<td>1.125</td>
<td>0.825</td>
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</table>
- Job submission
- Watching the jobs run
Job Submission and Output

```
Your job 18 ("hostname") has been submitted
bubba@nitrccce:~$ qsub -V -b y -cwd hostname
Your job 19 ("hostname") has been submitted
bubba@nitrccce:~$ qsub -V -b y -cwd hostname
Your job 20 ("hostname") has been submitted
bubba@nitrccce:~$ qsub -V -b y -cwd hostname
Your job 21 ("hostname") has been submitted
bubba@nitrccce:~$ qsub -V -b y -cwd hostname
Your job 22 ("hostname") has been submitted
bubba@nitrccce:~$ qsub -V -b y -cwd hostname
Your job 23 ("hostname") has been submitted
bubba@nitrccce:~$ cat hostname.*
node001
nitrccce
node001
nitrccce
node001
nitrccce
node001
nitrccce
node001
nitrccce
node001
```

```
bubba@nitrccce:~$
```
FSLView Before and After
Web Console User Account Shared Across Cluster
Browse tools by domain

- CT (45)
- Clinical Neuroinformatics (37)
- Domain Independent (65)
- EEG/MEG/ECOG (66)
- Imaging Genomics (35)
- MR (406)
- Optical Imaging (24)
- PET/SPECT (52)

Browse tools by functionality

- Atlas Application (35)
- Connectivity Analysis (14)
- Database Application (20)
- Experimental Control (8)
- Format Conversion (17)
- Genomic Analysis (10)
- Image Reconstruction (13)
- Information Theory (3)
- Modeling (60)
- Quantification (50)

Segmentation (60)

- Shape Analysis (70)
- Spatial Transformation (59)
- Statistical Operation (64)
- Surface Analysis (18)
- Temporal Transformation (31)
- Time Domain Analysis (24)
- Tractography (32)
- Visualization (91)

Find neuroimaging tools here:

Examples:
- modeling OR simulation
- morphology: AUIJ animation
- segmentation NOT Linux
- region of interest

Featured tool/resource:

NIRAL Utilities

NIRAL Utilities are open-source applications developed at UNC-Chapel Hill in the Neuro Image Research and Analysis Lab (NIRAL). These utilities are C++ based command line applications that allow image analysis and processing using ITK or VTK

Latest News

- Computational Morphometry Toolkit (CMTK) • Jan 10 • no comments
  GMTK 3.0 released
  We are pleased to announce Release 3.0 of CMTK, the Computational Morphometry Toolkit (code name "Cambridge"). This release fixes a number of major problems in earlier releases, specifically: 1. The handling of affine transformation matrices...
- [The IT Human Brain Atlas (v3) • Jan 5 • no comments]
  HOW TO update
  The document "HOW TO register DTI data to the IT Human Brain Atlas (v3) using DTI-TK" has been revised. The new HOW TO document includes an extra step that combines the affine and non-linear transformations in one, in order to accomplish transformation...
- [Vaa3D and Vaa3D-Neuron • Dec 30, 2013 • no comments]
  Vaa3D version 2.685 is released
  The Vaa3D version v2.685 (http://vaa3d.org) has been released on Dec 28, 2013. This software suite has powerful modules for 3D visualization and analysis of multi-dimensional images and surface objects. This new release includes several significant...
- [LORIS • Dec 19, 2013 • no comments]
  LORIS 3.2.0 released
  It includes a number of bug fixes and improvements. Builds are available for Linux (Debian), MacOS X and Windows.
- [ITK • Dec 19, 2013 • no comments]
  Vaa3D version 2.665 is released
  The Vaa3D version v2.665 (http://vaa3d.org) has been released on Dec 19, 2013. This software suite has powerful modules for 3D visualization and analysis of multi-dimensional images and surface objects. This new release includes several significant...
- [LORIS • Dec 18, 2013 • no comments]
  LORIS 3.2.0 released
  It includes a number of bug fixes and improvements. Builds are available for Linux (Debian), MacOS X and Windows.
- [ITK • Dec 18, 2013 • no comments]
  Vaa3D version 2.665 is released
  The Vaa3D version v2.665 (http://vaa3d.org) has been released on Dec 19, 2013. This software suite has powerful modules for 3D visualization and analysis of multi-dimensional images and surface objects. This new release includes several significant...

Community

- Conferences and workshops
- General community forum
- Funding opportunities
- Publications
- Career opportunities
- Submit community news
- Submit tool/resource

[8,354 registered users]

Recently active forums

- Tumor3d help
  BE, R, and ITK - output ftll have different intensity
  [25 posts, last post 2 hours ago]
- Vaa3D and Vaa3D-Neuron help
  RC, R, IIT4, and IIT5 have different intensity
  [340 posts, last post 4 hours ago]
- 1006 Functional Connectomes Project open discussion
  RC, documentation of cogn. assessments
  [227 posts, last post 4 hours ago]

Recently updated files

- Recent Brain Extraction Tool
  [Etiq: nbc-2014-01]
  [Latest file: Jan 10]
- Computational Morphometry Toolkit (CMTK)
  [Etiq: cmtk-3.0.0]
  [Latest file: Jan 9]
- MABMIS for Slicer 4: Multi-Atlas Based Multi-Image Segmentation
  [MABMIS, slicer4, MABMIS manual]
  [Latest file: Jan 9]

Recently registered

- Jan 10 GLMdenoise: a fast automated technique for denoising task-based fMRI data
- Jan 9 MABMIS for Slicer 4: Multi-Atlas Based Multi-Image Segmentation
- Jan 1 Interniu/Unpainted Kinematic Filter (UKF) Tractography Software v1.0
Additional Browsing

Tools/Resources

You searched for: Segmentation

Narrow your results:

- Domain
  - MR (64)
  - CT (10)
  - PET/SPECT (9)
  - see all >>

- Functionality
  - Segmentation (60)
  - Visualization (33)
  - Quantification (30)
  - Spatial Transformation (20)
  - Modeling (16)
  - see all >>

- Type of Resource
  - Information Resource (12)
  - Algorithm or Reusable Library (11)
  - Platform or Development Environment (7)
  - Hardware (1)
  - see all >>

- License
  - Open Source

- Development Status
  - Under Development

- Programming Language
  - C++

- Operating System
  - Linux

- Supported Data Format
  - ANALYZE (5)
    - NIfTI-1 (33)
    - DICOM (24)
    - see all >>

- Additional Browsing

NITRC Computational Environment is now available on Amazon Marketplace. Check it out!
<table>
<thead>
<tr>
<th>Category</th>
<th>License</th>
<th>Development Status</th>
<th>Domains</th>
<th>Environment</th>
<th>Intended Audience</th>
<th>Natural Language</th>
<th>Operating System</th>
<th>Pipelining and Workflows Supported</th>
<th>Programming Language</th>
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<td>E- Maturity</td>
<td>Domain</td>
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<td>E/FOE/ML</td>
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<td>Development Status</td>
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</tbody>
</table>

1/14/2014
Welcome to the NITRC Community

Community Resources
- Community Forums (general interest topics)
- Recently Active Forums (aggregate of forum activity across NITRC)
- Events (conferences, symposiums, competitions, ...)
- News (announcements and news for the NITRC community)
- Funding opportunities, previously funded projects
- Career Opportunities (for post docs, research scientists, faculty)
- Documents (NITRC presentations, logos, scientific posters, publications, ...)
- NITRC (using NITRC, resources, technical information)

Upcoming Event Deadlines

<table>
<thead>
<tr>
<th>Due Date</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 15</td>
<td>Abstract submission deadline for CNS 2014 Organization for Computational Neurosciences 2014 (Quebec, Canada)</td>
</tr>
<tr>
<td>Feb 18</td>
<td>Abstract submission deadline for 16th International Neurosciences Winter Conference 16th International Neurosciences Winter Conference April 8 - April 12, 2014 (Slovenia, Austria)</td>
</tr>
<tr>
<td>Mar 1</td>
<td>Application deadline for 16th Advanced Course in CNS (ACCN) 16th Advanced Course in CNS (ACCN) (Frankfurt am Main, Germany)</td>
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</tbody>
</table>

What's New

Recently Active Forums
- Tumormri help
  - 60 posts, last post 2 hours ago
- Vaa3D and Vaa3D-Minor help
  - 40 posts, last post 4 hours ago
- 1000 Functional Connectomes Project open-discussion
  - 3 posts, last post 4 hours ago
- WFU_PickAtlas help
  - 2 posts, last post 1 hour ago
- NITRC Community: open-discussion
  - 123 posts, last post 18 hours ago

Latest News
- Computational Morphology Toolkit (CMTK) v3.0 released
  - We are pleased to announce Release 3.0 of CMTK, the Computational Morphology Toolkit (code name "Cambridge"),
    - The ! human Brain Atlas (v.3), Jan 10, no comments
  - How TO update
    - The document "HOW TO register DTI data to the IT Human Brain Atlas (v.3) using DTR-TH" has been revised. The new HOW TO document includes an extra step that combines the affine and non-linear transformations in one, in order to accomplish transformation.
    - Vaa3D and Vaa3D-Minor, Dec 30, 2013, no comments
- Vaa3D version 2.055 is released
  - The Vaa3D version 2.055 (v.2.055) has been released on Dec 28, 2013.
  - Vaa3D and Vaa3D-Minor, Dec 28, 2013, no comments
  - New version of MaskIt released
    - MaskIt v1.1 has been released. It includes a number of new features and improvements.

1/14/2014
### Data Resources

#### FCP Classic Data Sharing Samples

On behalf of the ‘1000 Functional Connectomes’ Project, we are pleased to announce the unrestricted public release of 1200+ ‘resting state’ functional MRI (fMRI) datasets independently collected at 33 sites. All datasets have been generously donated by the principal investigators from the member sites, for the purpose of providing the broader imaging community complete access to a large-scale functional imaging dataset. *Age, sex, and imaging center information* are provided for each of the datasets. In accordance with HIPAA guidelines, all datasets are anonymous, with no protected health information included. We anticipate this data-sharing effort will equip researchers with a means of exploring and refining F-MRI approaches, and facilitate the growing ethos of sharing and collaboration.

Disclaimer: The ‘1000 Functional Connectomes Project’ datasets are provided freely without assurance of quality or appropriateness for usage.

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*Download Links: [Baltimore Data](#), [Bangor Data](#), [Beijing Data](#), [Berlin Data](#), [Cambridge Data](#), [Cleveland CCF Data](#), [Dallas Data](#), [Durham Data](#), [ICBM Data](#), [Leiden Data](#), [Leipzig Data](#).*

[1] Download links for all data sets are available [here](#).
Data Workflow
NITRC Project -> IR Project -> Subjects -> Subject -> Images
Search: Sample Filter

(M/F LIKE M) AND ((Age >= 40) AND (Age <= 50)) AND (Project LIKE fcon_1000)

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