

NATIONAL SCIENCE FOUNDATION

**MRSEC**



MATERIALS  
RESEARCH  
SCIENCE &  
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CENTERS

# WEB TECHNOLOGIES IN RESEARCH AND EDUCATION

**MRSEC.ORG PREM-MRSEC.ORG**

Presentation to Directors' Meeting March 10, 2011  
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# Web Trends in Higher Education and Research

- Online resources and online learning
- Huge increase in use of mobile devices (iPad, smartphones, etc.)
- Pressure to reduce \$\$\$
- Open Source Movement

# Proprietary Software

- Pay for the software, licensing, support
- Closed source
- Cannot modify
- E.g., Microsoft Office, Oracle, SharePoint

# Open Source Software

- Free to download/install
- Often requires time to customize/modify
  - “Free as in a puppy”
- Community-based support
- Can modify source code
- E.g., OpenOffice, Linux, Drupal, Wordpress

# Open Source and Higher Ed Parallels

- Why Open Source / Open Access and Education go hand in hand
- In the academy, knowledge is the product
- Philosophy of contributing to the overall expertise and knowledge base of the community

# Higher Ed Tasks and Tools

## Tasks

- Research
- Teaching
- Collaborating
- Analyzing
- Reading
- Writing
- Publishing

## Software Tools

- Office Software
- Data Analysis Software
- Citation Managers
- Web Publishing
- Learning Software
- Document Managers
- Image Editors

# OPEN SOURCE SOFTWARE AND TOOLS

COMPILED BY STANFORD OPEN SOURCE LAB

# Desktop Applications

- Operating System:
  - Linux in many flavors:
  - Ubuntu: <http://www.ubuntu.com/>
  - Mint: <http://www.linuxmint.com/>
  - Fedora: <http://fedoraproject.org/>
  - Debian: <http://www.debian.org/>
- Office Suite (word processor, slideshow, spreadsheet, database, drawing):
  - OpenOffice: <http://openoffice.org>
  - LibreOffice: <http://www.libreoffice.org/>
- PDFs: OpenOffice can create PDFs of any type of file it can open or create
- Image Editing:
  - GIMP: <http://www.gimp.org/>
  - OpenOffice Draw
- Citation Management: Zotero: <http://www.zotero.org/>



# Communication

- Instant Messaging: Adium <http://adium.im/>
- Video Conferencing: Big Blue Button  
<http://bigbluebutton.org/>
- Skype <http://skype.com> (closed source, free)

# Web Publishing and Collaboration

- Content Management Systems
  - Drupal: <http://www.drupal.org>
  - Wordpress: <http://www.wordpress.org>
  - Joomla!: <http://www.joomla.org/>
  - Plone: <http://plone.org/>
- Learning Management Systems
  - Sakai: <http://sakaiproject.org/>
  - Moodle: <http://moodle.org/>
- Document Management
  - Alfresco: <http://www.alfresco.com/>
  - Feng Office: <http://www.fengoffice.com>
- Publishing: Open Journal Systems <http://pkp.sfu.ca/ojs/>
- Surveys: Lime Survey <http://www.limesurvey.org/>

# Research

- Statistics and Data Analysis: R  
<http://www.r-project.org/>
- Virtualization: VirtualBox  
<http://www.virtualbox.org/>

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# Web Technologies for mrsec.org / prem-mrsec.org

- Make web technologies more usable for scientists
- Educating Educators – webmasters' meetings can facilitate delivery of technology to end users
- Understand specifics MRSEC / PREM research needs and offer targeted technological solutions

# mrsec.org Active Sections

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# Open for Development

- Industry outreach
- Education
  - Teaching Modules
  - Assessments
- Jobs
- From Webmaster's meeting
  - Tools for Annual report
  - Centralized publications management (via biblio module)
  - Webform for surveys, assessments, etc.

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# On the Boards

- New logo has been published
- Webmasters' online meetings
- New design coming soon
- Highlights new format
  - Images with captions
  - Front page slideshow
- New sections

# Drupal Out-of-the-box Tools

- Conference Organizing Distribution  
<http://drupal.org/project/cod>
- Open Academy – Department website  
<http://openacademy.chapterthree.com>
- Biblio <http://mrsec.org/biblio>
- Webform

Featured  
Presentation

# Thank you

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Questions or suggestions?

Please let me know how [mrsec.org](http://mrsec.org) and  
[prem-mrsec.org](http://prem-mrsec.org) can better support  
MRSEC / PREM research needs

Please email me [webmaster@mrsec.org](mailto:webmaster@mrsec.org)

# Free, Closed-Source Software

- Free to use
- Pay for enhancements
- Closed source - Cannot modify
- Ads, user behavior data collection
- E.g., Google Docs, Mendeley, Facebook, surveymonkey.com, blogspot.com

# People and Technology

- Knowledge/information is not making their way to the internet because it is not easy enough for people to post it
  - People do not have time to copy and paste - so they just do not do anything
- Example: Experimental tricks for specific instrumental system (e.g. how to align this laser; how does this Labview code work) may not be well-documented
  - Retaining knowledge in lab requires people to teach each other. This doesn't always happen.
  - Many scientists do not have time to learn new computer technologies (CMS etc) so scientific know-how does not get online.
  - Some laboratories are adopting internal Wikis, blogs. Is [www.blogspot.com](http://www.blogspot.com) sufficient solution?
- What will it take for more scientists to embrace web technologies?
  - How to change technology so researches will use it

# Importance of Formats

Technology  
Sidetrip

- Images - .jpg or .png, not MS Word
- Vector format (pdf) vs pixel format (jpg)
- Print quality (300 dpi) is different from web quality (72 dpi)
  
- Why would you care?

# Formats – pixels vs. vectors

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Your results are presented to others, make them readable