



# **Developing small worlds of e-science: using quantum mechanics, biological science, and oceanography for education and outreach strategies for engaging research communities within a university**



## **Twelfth International Conference on Grey Literature**

Florida State  
University  
Libraries - USA  
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National Technical Library, Prague, Czech Republic, 6-7 December 2010

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A photograph of a chalkboard with the Dirac equation written in white chalk. The equation is: 
$$\left\{ i\hbar \left( \frac{\partial}{\partial x_0} + \alpha_r \frac{\partial}{\partial x_r} \right) + \alpha_m m c \right\} \psi = 0$$

Relativistic quantum mechanical wave equation formulated by Dirac in 1928

# Models - Open Archival Information System (OAIS), DCC Curation Lifecycle, Boyer's Model of Scholarship

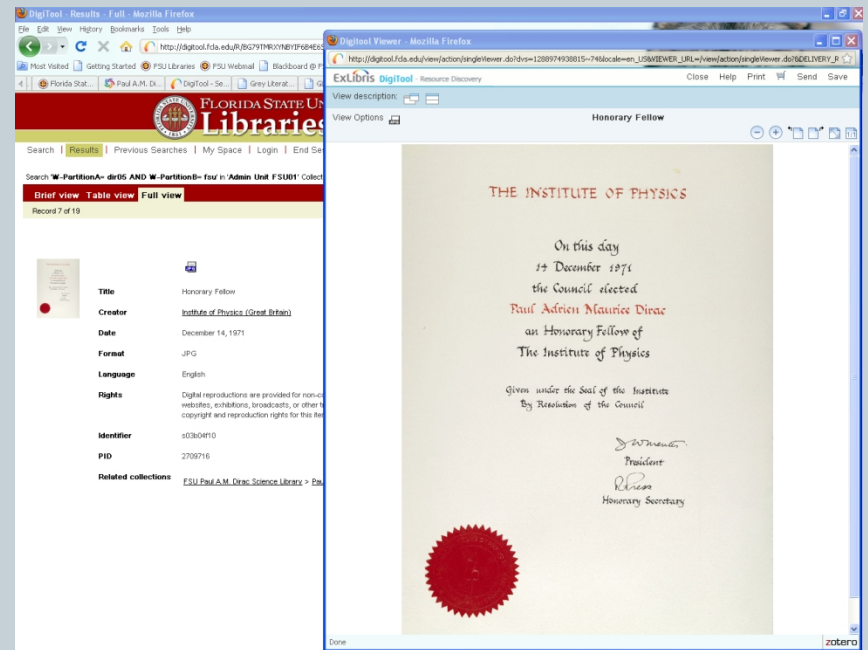


- International Standard Organization (ISO) OAIS – “provides a framework for understanding and increased awareness of archival concepts needed for Long Term digital information preservation and access; provides a framework for describing and comparing different Long Term Preservation strategies and techniques” (CCSDS, 2009).
- DCC Curation Lifecycle – “provides a graphical, high-level overview of the stages required for successful curation and preservation of data from initial conceptualisation or receipt” (DCC, 2010).
- Boyer's Model of Scholarship (Nibert, 2008)
  - Discovery – Build new knowledge through traditional research
  - Integration – Interpret the use of knowledge across disciplines
  - Application – Aid society and professionals in addressing problems
  - Teaching – Study teaching models and practices to achieve optimal learning

# Research Disciplines – Physics, Biological Science, and Earth, Ocean, & Atmospheric Science



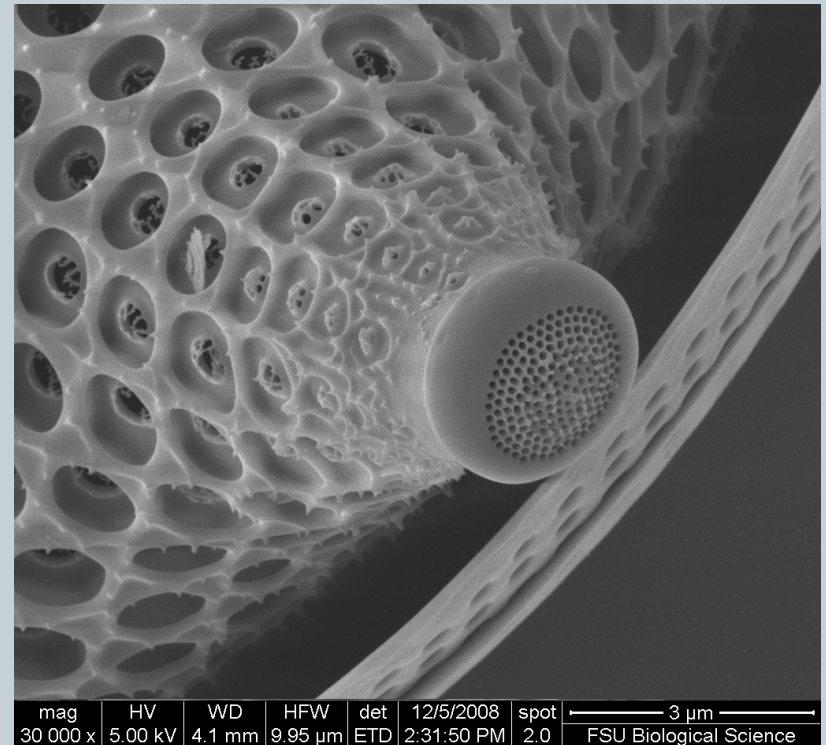
- Physics – quantum mechanics (Dr. Paul A.M. Dirac)
  - 1000 digitized objects
  - OCLC WorldCat, OPAC, DigiTool accessible
  - FDA & MetaArchive preserved (in process)
- Selected Materials Digitized
  - Key lectures, hand written 1926 dissertation & 1930 1<sup>st</sup> ed. Principles of Quantum Mechanics, photos, national society certificates from around the world, deteriorating negatives to name a few.



Honorary Fellow Certificate,  
Institute of Physics, Great  
Britain, December 14, 1971

# Research Disciplines – Physics, Biological Science, and Earth, Ocean, & Atmospheric Science - cont.

- Biological Science – Dr. A.K.S.K. Prasad
  - 14 images open-access (online); SEM/LM images; thousands (offline)
  - OCLC WorldCat, OPAC, DigiTool accessible
  - FDA & MetaArchive preserved (Diatomscales I & II collections)
- Earth, Ocean, & Atmospheric Science – various FSU faculty/scientists
  - 21 tech reports open-access
  - DigiTool accessible
  - OCLC WorldCat, OPAC, FDA & MetaArchive (in process)

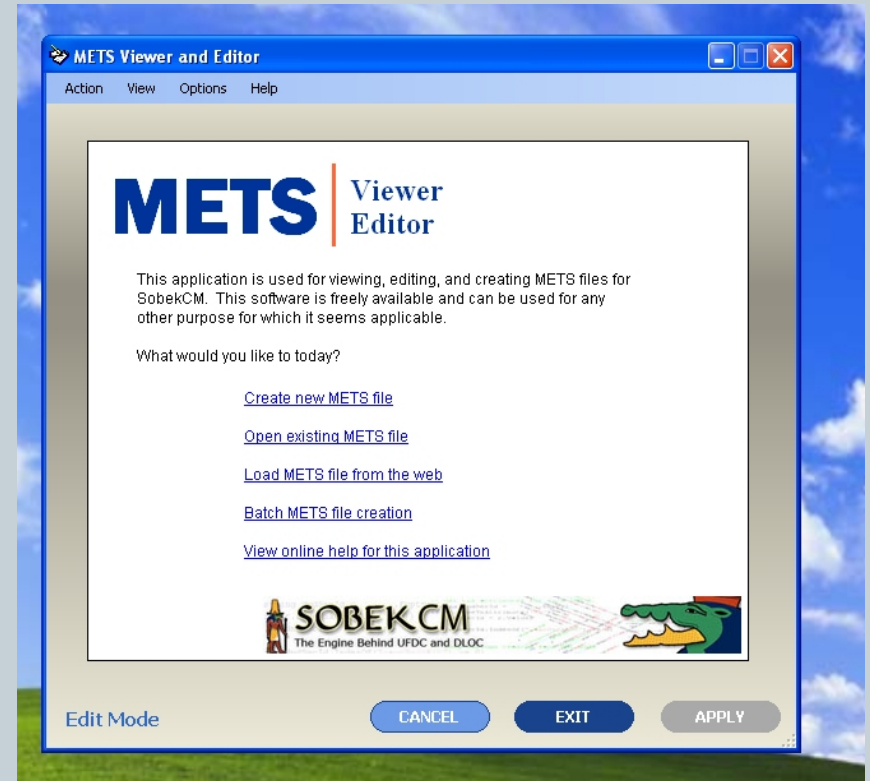


Dr. Prasad's research - PC-D2K87243  
Cerataulus smithii SJB-Gulf\_002



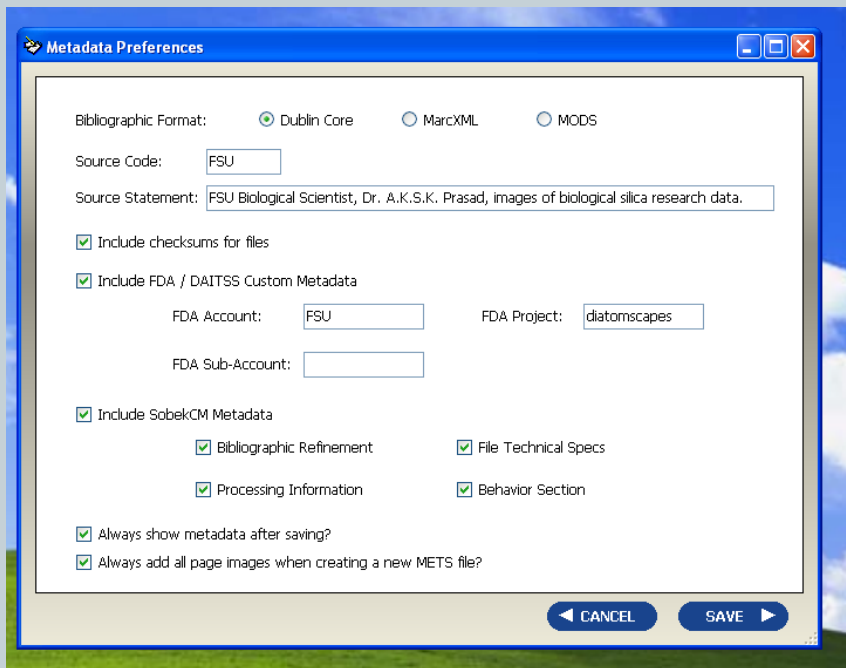
# Representation – Metadata Encoding Transmission Standard (METS) Creation Tool (testing)

- "Developed by UF integrated in their processes with an origin around 2005 and in use since then by UF. Recently rebranded and repurposed for larger consumption and use."
- Open-source SobekCM Online METS metadata creator/editor tool
- Creates OAIS SIP & AIP for FDA
- Used by University of Central (UCF)
- Currently being tested by Florida International University (FIU) and Florida State University (FSU)

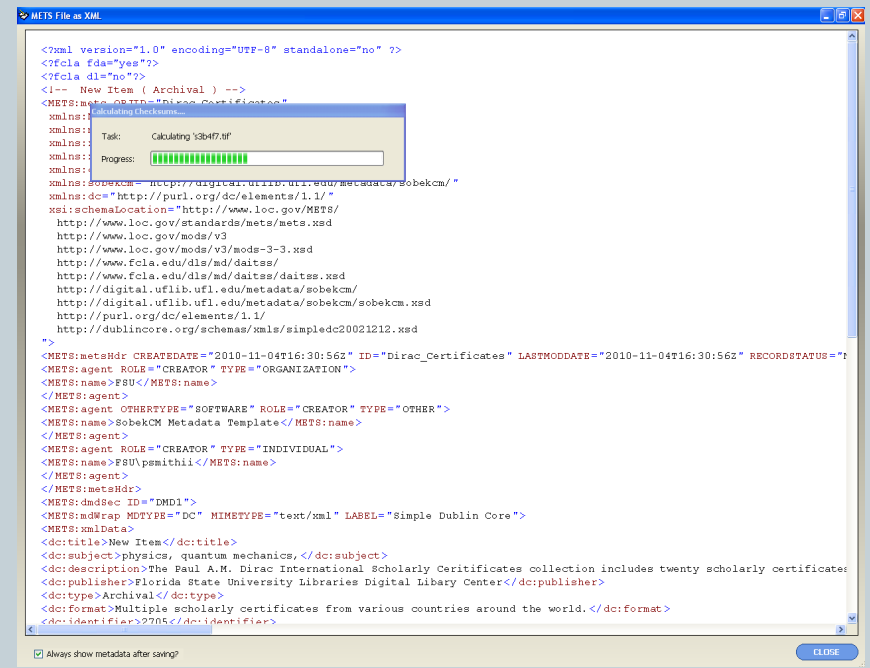


FSU began testing 2010-11-04

# Representation - Metadata Encoding Transmission Standard (METS) Creation Tool (testing) - cont.



METS creation data entry bibliographic information - metadata standards, checksums, & FDA preservation options



METS creation tool checksums demo example of Paul Dirac certificate tiff file images



# Preservation - Florida Digital Archive (FDA)

- FDA – FSU joined 2009
- Digital preservation strategy
- DAITSS open-source software
- OAIS conformance (METS SIP, AIP)
- Checksum AIP required
- Requires FDA agreement (free)

The screenshot shows a web browser window displaying the FSU DIATOMSCAPES package information. The browser address bar shows the URL: http://fda.fda.edu/statistics/package/E20081001\_AAAAE#. The page title is FSU\_DIATOMSCAPES. Below the title, there is a section for 'totals' showing 40 files and 5 GB of bytes. An 'admin info' section provides details about the package name (FSU\_DIATOMSCAPES), ingest time (Wed Oct 01 16:12:42 -0400 2008), volume, issue, title (The e-Curation of Diatomscapes. Images of Biological Silica), extension, and entity ID.

id	name	md5	sha1	size
F20081001_AAAGUD	2K14635.tif	1985b0120489c765be945c53dd547c36817f2ead072a3120ab02e96029c37351764c904a	303.2 MB	
F20081001_AAAGUE	2K14636.tif	1c04ee73246557a3a365cd6bdeb404c3eabe099072db7d703f54700d75295f0bdad2dc56	183.6 MB	
F20081001_AAAGUF	2K14648.tif	481c6bb2aba5a0e4fb6490d3804df9a420c2cf4c8fzb9a04c15c5df03b31918212dd33ab	301.5 MB	
F20081001_AAAGUG	b-1606.tif	9ccd63eb28e99c4bdd585c2861b383a7047580790d1129b620d7774859ecc12bbe2327ee	284.4 MB	
F20081001_AAAGUH	b-1606copy.tif	4e95554c8cc5e748f58c8e23fa3c365941568c9d023af038f1b2de6a204ece17252f241c	10.9 MB	
F20081001_AAAGUI	delphineis_prasad_1986.tif	ed1c67610dff82f6c70d8eb687ebe515195acee1ec9f48f6082e88dc8d13ec20d207cc3	16.8 MB	
F20081001_AAAGUJ	diatom.tif	f4ce994a7d9b42de9afce89edf0e9fcd3df8a41225c5959594566dea3ed16e84203836e	190.5 MB	
F20081001_AAAGUK	diatoms_metadata_2005.txt	617cebda0c77a2cbf2f3d43d1755fc4d9611b42abbd278cbb9da9f505e6ff28993a3e	12.2 KB	
F20081001_AAAGUL	EM962533.tif	663663982dde11d79d28560725a26b559c59391d0206017d275661567e633064c6d0bb96	296.6 MB	
F20081001_AAAGUM	EM962533_copy.tif	c2cade1d4b370df701503a6547ec870044116ddfca39954559a1198096b28a93295819b9	10 MB	
F20081001_AAAGUN	EM972940.tif	74858066904ef86df25b3398b6625166d29ebf1d7295ad45ef495101f7fb9836468eaca	303 MB	
F20081001_AAAGUO	EM972940_copy.tif	218a024ae2f2810ae6ff27a26baa158bf326426582f3503dab7f6c4f2a9eb8535cc113a	9.1 MB	
F20081001_AAAGUP	EM993714.tif	de1ceb4c945bb6335efa4b21b08323672f58ecaeabc76de6994f292d2c4b3b9dce3b893f	296.4 MB	
F20081001_AAAGUQ	EM993714_copy.tif	7ba254a410994c35a1b3352319820d8b a232a0c9c90360956830eff7ded6c5628fb3fa3a	12.3 MB	
F20081001_AAAGUR	EM993715.tif	a844b6e1ea2abbcbad8fa4ee370cd9c437d38d481b44ec3bdf3fc8aa078be6045d993509	309.3 MB	
F20081001_AAAGUS	EM993721.tif	6fd7d1927668abca5f8f6933e2c9f7b599790d7442697ba8d7bb02fdae63f34c782ce0	298.1 MB	
F20081001_AAAGUT	EM993721_copy.tif	b1197c6a9b0419f127d04693b82f7a2a1865a066d230123ace271e562044731782f384d8	10.9 MB	
F20081001_AAAGUJ	EM993801.tif	c1524d062d1110f6d885c6b7c3e8886acbc5943661bbdc1738c3464dfc13abc57efbda0	309 MB	
F20081001_AAAGUV	EM993801_copy.tif	9cb568f6629c0831d6d66ee841c9289b f441cd98b62912402dcd4126f6b98d55d0f3e08	11.7 MB	
F20081001_AAAGUW	FSU_DIATOMSCAPES.xml	e34901dbdf5da0d32427b8a983105cb5c00c203d9db9a3c1c7e850487b1cea48197e73c6	12.7 KB	

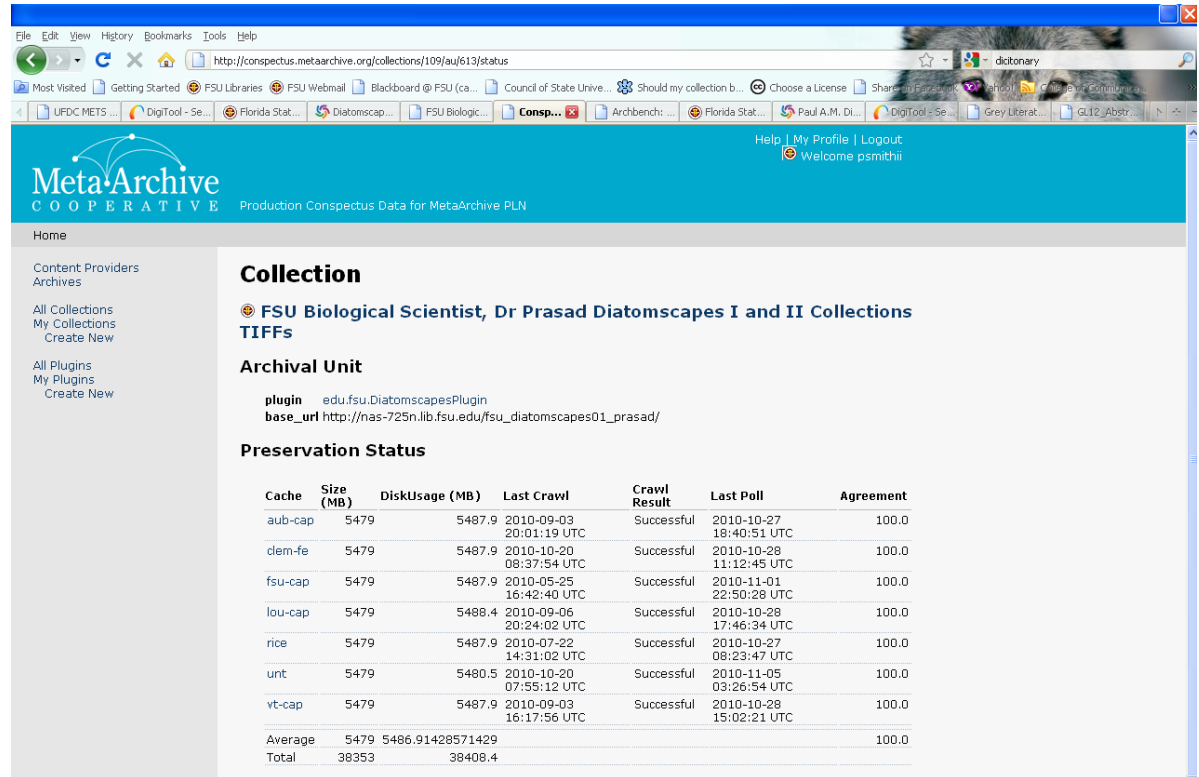
## Biological Science Diatomscapes I & II collections preserved via FDA

(Note: This collection was the first to be preserved via FDA as part of demo preservation pilot project & was later used to influence senior management for FSU Libraries to join FDA)



# Preservation - MetaArchive

- MetaArchive – FSU joined 2004
- Distributed digital preservation strategy
- LOCKSS open-source software
- OAIS conformance (SIP, AIP)
- Requires XML plugins, manifest page, conspectus DB entry
- Requires cooperative agreement (fee)



The screenshot shows a web browser window displaying the MetaArchive website. The page title is "Collection" and the collection name is "FSU Biological Scientist, Dr Prasad Diatomscapes I and II Collections TIFFs". The page includes a sidebar with navigation links, a "Collection" section with a description, an "Archival Unit" section with plugin and base URL information, and a "Preservation Status" table.

Cache	Size (MB)	DiskUsage (MB)	Last Crawl	Crawl Result	Last Poll	Agreement
aub-cap	5479	5487.9	2010-09-03 20:01:19 UTC	Successful	2010-10-27 18:40:51 UTC	100.0
clem-fe	5479	5487.9	2010-10-20 08:37:54 UTC	Successful	2010-10-28 11:12:45 UTC	100.0
fsu-cap	5479	5487.9	2010-05-25 16:42:40 UTC	Successful	2010-11-01 22:50:28 UTC	100.0
lou-cap	5479	5488.4	2010-09-06 20:24:02 UTC	Successful	2010-10-28 17:46:34 UTC	100.0
rice	5479	5487.9	2010-07-22 14:31:02 UTC	Successful	2010-10-27 08:23:47 UTC	100.0
unt	5479	5480.5	2010-10-20 07:55:12 UTC	Successful	2010-11-05 03:26:54 UTC	100.0
vt-cap	5479	5487.9	2010-09-03 16:17:56 UTC	Successful	2010-10-28 15:02:21 UTC	100.0
Average	5479	5486.91428571429				100.0
Total	38353	38408.4				

Biological Science Diatomscapes I & II collections preserved via Auburn, Clemson, FSU, Louisville, University North Texas, and Virginia Tech LOCKSS caches (Note: This collection was the first FSU collection to be successfully preserved via MetaArchive in 2009)

# Dissemination – OPAC, OCLC WorldCat, DigiTool



The screenshot shows the Florida State University Libraries OPAC. The search results for 'Diatomscales I : Images of biological silica.' are displayed. The record includes the author 'A. K. S. K. Prasad', the publisher 'Tallahassee, Fla. : Florida State University, ©2009', and a summary stating 'This collection consists of 14 images of biological silica, obtained from various locations and produced from the JEOL JSM-840 scanning electron microscope.' The interface also features navigation options like 'Add All', 'Print', 'Email', and 'Cite this'.

FSU OPAC Diatomscales record

The screenshot shows the OCLC WorldCat interface. The search results for 'Diatomscales I : Images of biological silica.' are displayed. The record includes the author 'A. K. S. K. Prasad', the publisher 'Tallahassee, Fla. : Florida State University, ©2009', and a summary stating 'This collection consists of 14 images of biological silica, obtained from various locations and produced from the JEOL JSM-840 scanning electron microscope.' The interface also features navigation options like 'Add to list', 'Add tags', 'Write a review', and 'Rate this item'.

OCLC WorldCat Diatomscales record

# Dissemination - OPAC, OCLC WorldCat, DigiTool - cont.



The screenshot displays the DigiTool interface within a Mozilla Firefox browser. The main page is titled "FLORIDA STATE UNIVERSITY Libraries' Digital Collections". The search results are for "Dr. A.K.S.K Prasad's select images of biological silica". The results are sorted by Ranking and show 14 records. The first six records are listed below:

Rank	Image	Species Name	Author	Institution
1		<b>Staurosira venter (Ehrenberg)</b> Grunow	Dr. A.K.S.K. Prasad	Florida State University
2		<b>Odontella aurita (Lynobye)</b> Brébisson 1838	Dr. A.K.S.K. Prasad	Florida State University
3		<b>Azbeilia nodulifer (A. Schmidt)</b> Fryxell & Sims	Dr. A.K.S.K. Prasad	Florida State University
4		<b>Surirella fastuosa (Ehrenberg)</b> Kützning	Dr. A.K.S.K. Prasad	Florida State University
5		<b>Desikoneis howellii Prasad 1993</b>	Dr. A.K.S.K. Prasad	Florida State University
6		<b>Delphineis livingstonii Prasad 1986</b>	Dr. A.K.S.K. Prasad	Florida State University

FSU Libraries DigiTool Diatomscapes record

# Continuation - Horizon Issues, Ideas, & Plans



- Submitted a FSU Faculty Research Library Materials (FRLMG) for acquisition of digital curation/preservation publications 2010-10-25
- Submitted iConference 2011 proposal 2010-10-29
- Submitted IASSIST 2011 proposal 2010-11-03
- Develop a FSU Libraries Data Management Plan
  - Metadata, Data, Content, Submission, and Preservation Policies
  - Register policies in OpenDOAR & develop OAI base URLs
- Develop & register Open Access Repository Material Archiving Policies with ROARMAP (Registry of Open Access Repository Material Archiving Policies)
- Publish, promote, and preserve FSU faculty research
- Improve organization, digitization, workflows, preservation & collaborations
- Apply & secure grant funding in 2011 for development & curation