Cyber-Archaeology and Challenges of Research Data Curation: The Impact of New Approaches to Data Capture, Curation, Analyses and Dissemination

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IDI leads you to digital infrastructure to support your research and instruction.

What is IDI?

UCSD’s Integrated Digital Infrastructure (IDI) service streamlines the delivery of cutting-edge IT services to UCSD faculty, researchers, and students.

Working with all the IT providers on campus (ACMS, ACT, Calit2/GI, the Library, SDSC, and departments/divisions), IDI directs you to:

- **High-speed network connections**
  - Push big data swiftly across campus, to SDSC facilities, and to the world
- **High-performance computing**
  - Make your cluster dollars go further, or take advantage of as-needed cycles for smaller projects
- **Colocation facilities**
  - Find a home for your equipment that’s greener, safer, and wastes less lab space
- **Storage/Cloud**
  - Get more disk space, better backups, improved uptime/accessibility.
- **Tools & training**
  - Learn about electronic lab notebooks for the classroom & lab, and find cutting-edge IT training opportunities at UCSD
- **Research Data Curation**
  - Manage, curate, and archive the results of your research work

IDI Showcases May 6-7

IDI Showcases on May 6 & 7 offer lightning talks from faculty who have benefited from IDI support, plus info on how to apply for support in 2015/16. Join us to learn more!

IDI Call for Proposals 2015/16

The IDI Call for Proposals for funding for 2015/16 Transformational Projects and Digital Research Platforms is now available! Proposals are due on June 15, 2015, so act fast.
“Inventing a persistent, collaborative research and education environment as a model for the major research university in the 21st Century” – Larry Smarr, Mission Statement, Calit2
The National Science Foundation’s Integrative Graduate Education and Research Traineeship (IGERT) program is investing $3.2 million over five years in a University of California, San Diego-based project for Training, Research and Education in Engineering for Cultural Heritage Diagnostics (TEECH). With field sites in Italy, Jordan and Mongolia, the international IGERT-TEECH program is carried out through the UCSD Center of Interdisciplinary Science for Art, Architecture and Archaeology (CISA3), a partnership of the California Institute for Telecommunications and Information Technology (Calit2), Jacobs School of Engineering, and UCSD’s Division of Arts & Humanities.

Graduate Student Participation:

NSF Integrative Graduate Education and Research Traineeship (IGERT) grant – 2010 – 2015 - $3.2 million

Training, Research and Education In Engineering for Cultural Heritage Diagnostics (TEECH)

Falko Kuester, PI
Thomas Levy, Co-PI
Maurizio Seracini, Co-PI
TYPES OF PROJECTS

- Cyberinfrastructure
- Paleomagnetic Dating
- Archaeometallurgy / Cultural Heritage
- Cultural Heritage
- Archaeometallurgy
- Cultural Heritage
The old way of digging and recording: 1979 - 1998
UCSD ELRAP in Jordan -
A ‘Deep Time’ Study of Technology (metallurgy) & Social Evolution

Co-Directors – Thomas Levy (PI) and Mohammad Najjar
UCSD Deep-time Metallurgy Research in Faynan, Jordan

- PPNB Village
  - Bead Production
  - 7500 – 6500 BC
- Early Bronze I
  - Metalworker’s Village
  - Ca. 3600 BC
- Islamic Copper Village
  - Ca. 13th c. AD
- Iron Age
  - Copper Factory
  - Ca. 1200 – 900 BC
- Early Bronze III-IV
  - Metal Manufactory
  - Ca. 2700 – 2000 BC

with Mohammad Najjar
New Explorations in Iron Age Edom – Anthropological & Historical Approaches

Organization of Craft Production (after Costin)

• Context – Degree of Elite Sponsorship
• Concentration – Distribution over landscape
• Scale – size of labor force, - principles of labor recruitment
• Intensity – full time/part-time

Trade

Ethnogenesis – Edom and Israel

Social Evolution

Khirbat en-Nahas, Jordan, ca. 10 ha
Helicopter shot courtesy Queen Noor
ACQUISITION
- Archaeology Research Design
- Digital Data Collection Tools
- Diagnostic Imaging/Geophysics
- Analytical Diagnostics
- ArchField
- OpenDig

CURATION
- Data Storage
- Geo-Spatial Mapping
- Augmentation
- ArchaeoSTOR
- California Digital Library

DISSEMINATION
- Cyber-Infrastructures
- Open Access
- Citizen Science
- Print Publishing
- CAVES
- Archaeo-Diplomacy

ANALYSIS
- Modeling & Simulation
- Visual Analytics
- Crowd Sourcing
- 3d Visualization
- Cultural Analytics
LIDAR (Light Detection And Ranging) - Laser Range Finder Scanner, Khirbat en-Nahas, Jordan, November, 2009  Project: Tom Wypych and Vid Petrovic
Calit2 - KAUST’s NexCAVE – International collaboration enables new portable NexCAVE & new Cyberinfrastructure

Jordan archaeology data displayed at KAUST
Grand opening, PI- Tom DeFanti, Calit2
Cyber-Archaeology Digital Data Avalanche in Jordan

EXCAVATION YEAR

GIGABYTES (GB)

0
500
1000
1500
2000

2007 2009 2011 2012
Cyber-Archaeology Digital Data Avalanche in Jordan

- Excavation Year:
  - 2007
  - 2009
  - 2011
  - 2012

- Data in GB:
  - 0
  - 500
  - 1000
  - 1500
  - 2000

- Key Data Point:
  - 172 GB
Cyber-Archaeology Digital Data Avalanche in Jordan

- **2007**: 172 GB
- **2009**: 1,373 GB


Gigabytes (GB)
Cyber-Archaeology Digital Data Avalanche in Jordan

GIABYTE (GB)

EXCAVATION YEAR

2007 2009 2011 2012

172 GB 1,373 GB 2,055 GB
2014 – Final publication of 10-years of field work and research, 2 volumes, 1,000 pages

New Insights into the Iron Age Archaeology of Edom, Southern Jordan

Volume 1

Thomas E. Levy, Mohamed Nadel, and Erbez Ben-Yosef

Levy • Nadel • Ben-Yosef

New Insights into the Iron Age Archaeology of Edom, Southern Jordan

Volume 1

Contents

Chapter 1: The Iron Age Context
Chapter 2: The Iron Age Pottery
Chapter 3: The Iron Age Tombs
Chapter 4: The Iron Age Sites
Chapter 5: The Iron Age Economy
Chapter 6: The Iron Age History

For more information, please visit www.edomarchaeology.com
Browse by Collection: UCSD Research Data Collections

View current collections below. Click an image or link for a full description.

Results 1 - 5 of 5

**Bee Research Methods: Video Demonstrations**
This collection shows bee behaviors and methods used to study bee behaviors.

**Khirbat en-Nahas Project**
A collection of archaeological artifacts and data for the excavation of the Khirbat en-Nahas site, and exploration of Iron Age state formation in southern Jordan.

**Santa Fe Light Cone Simulation research project files**
This project was the result of an ongoing effort by the Laboratory for Computational Astrophysics, leading to development of the Enzo simulation software capable of a seven-level adaptive mesh refinement (AMR) cosmology simulation.

**Scripps Institution of Oceanography, Geological Collections**
A growing archive of sea-floor samples and associated data supporting a diverse variety of scientific research.

**Teaching Bee**
This collection of documents provides teaching exercises and information for instructors of students ranging from junior high school through college.
Allow for full description of the collection, including controlled names, headings, notes and links to related resources.
ArchaeoSTOR

“The World’s Most Awesome Archaeology Database”
UCSD undergrad development team

Gabriela de la Torre, Chad Naylor, Rose Elliot, Carolyn Breeze
Grails to Rails

The old ArchaeoSTOR was coded in an ancient ten-year-old Grails version without a solid testing or maintenance framework. This had a lot of bugs and would need some serious rebuilding to get it into top shape...
The new ArchaeoSTOR, however, uses Ruby on Rails - a much more popular programming language that should make the new ArchaeoSTOR much easier to build and maintain.
Plans for ArchaeoSTOR

With Ruby on Rails, we should be able to build a well-functioning web app from the ground up, complete with good security and access control. In the future we hope that ArcheoSTOR can become a tool for the archaeology community as a whole.
Mada’in Salah, Saudi Arabia – October 7, 2013
Hijaz (Biblical Midian) –

KAUST – UCSD Cyber-Archaeology Expedition in al-Ula Valley
Falconviz – with Neil Smith
Mada’in Salah, Saudi Arabia – October 7, 2013
Hijaz (Biblical Midian) – SfM models

KAUST – UCSD Cyber-Archaeology Expedition in al-Ula Valley