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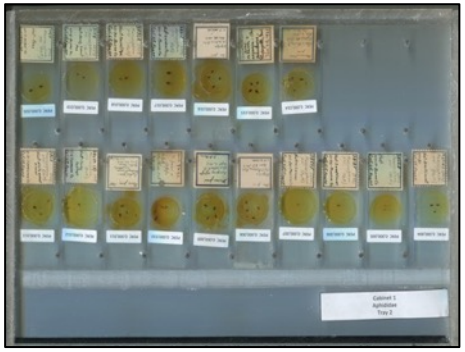
Objective

- Develop and implement an efficient workflow for cost-effective, high-throughput digitization of insect collections

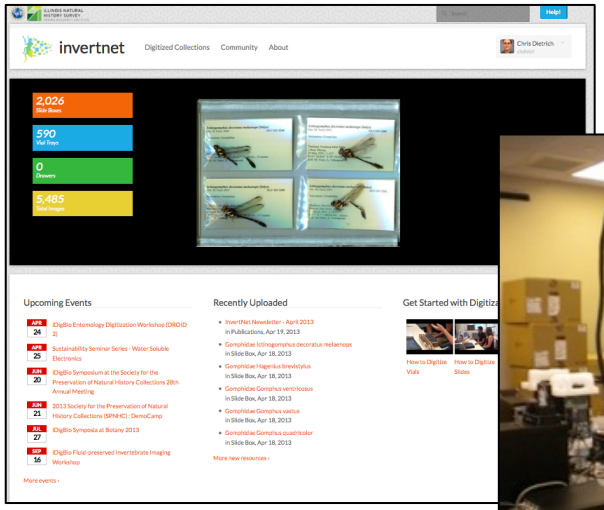


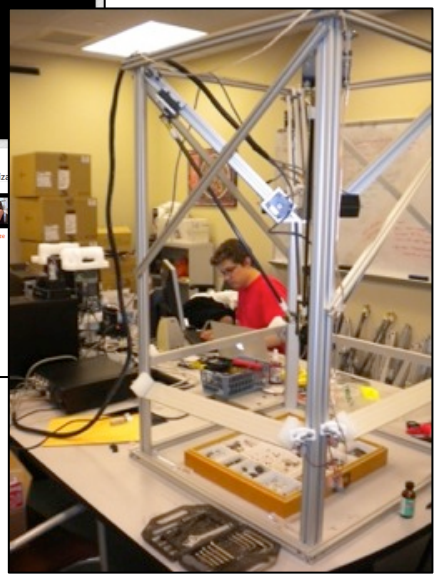
Specific Goals

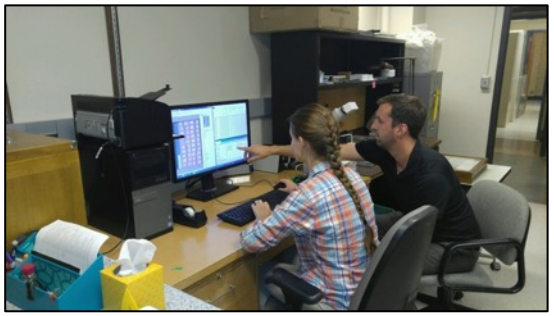
- Digitize all holdings of 22 midwestern arthropod collections (~50 million specimens)
  - Specimen images and metadata (label info)
  - Drawers, vials, slides
  - Advanced imaging (including 3D)
  - Best quality at reasonable cost (~$0.10/specimen)
- Provide access to images and other data via online virtual museum
  - browsable/searchable/zoomable web interface
  - link to other data providers (GBIF, iDigBio etc.)
- Provide platform for research and development of additional tools and resources
  - Data mining and analysis
  - Community building, collaboration, and support
  - Education, outreach, and reference

Accomplishments

- Created InvertNet cyberinfrastructure platform (invertnet.org)
- Implemented efficient workflows for slides and vials using 2D scanning technology
- Built 14 robotic drawer digitization systems & delivered to collaborators
- Built 180 TB storage system to house InvertNet image library
- Ingested >68,000 images and metadata from collaborating institutions representing >7.2 million specimens
- Developed image annotation tool to facilitate specimen-level data capture
- Linked InvertNet data repository to iDigBio portal and BugGuide.net
- Participated in numerous workshops, symposia, and planning meetings
- Trained numerous grad and undergrad students

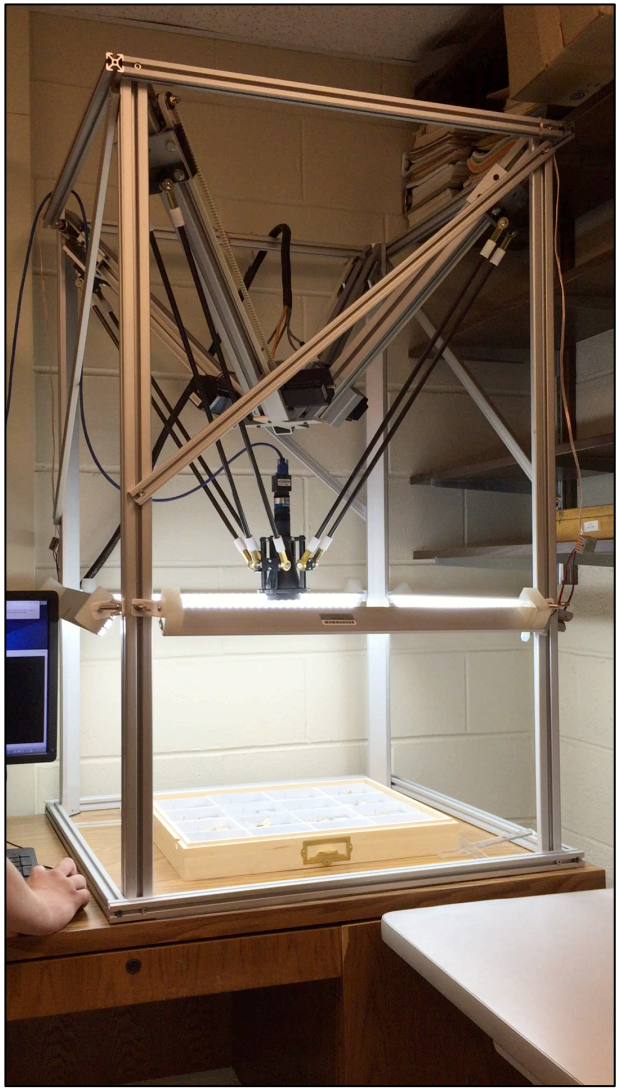






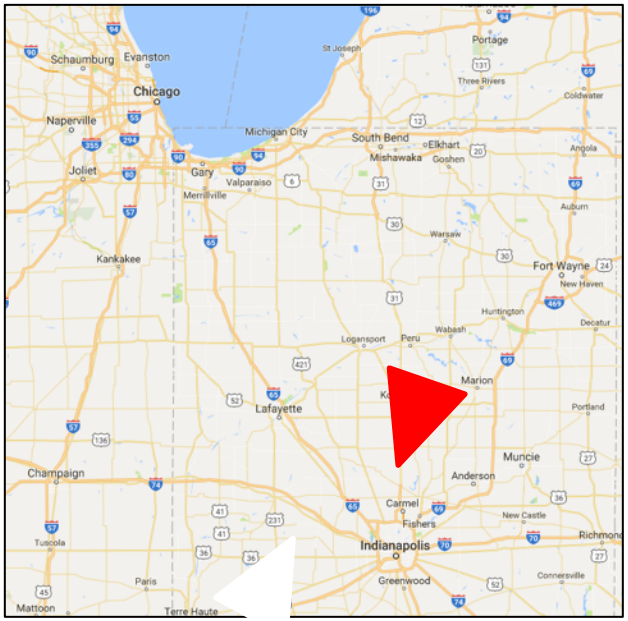
Ongoing Activities

- Capturing whole-drawer images at collaborating institutions
- Imaging workflows being tested for other TCNs

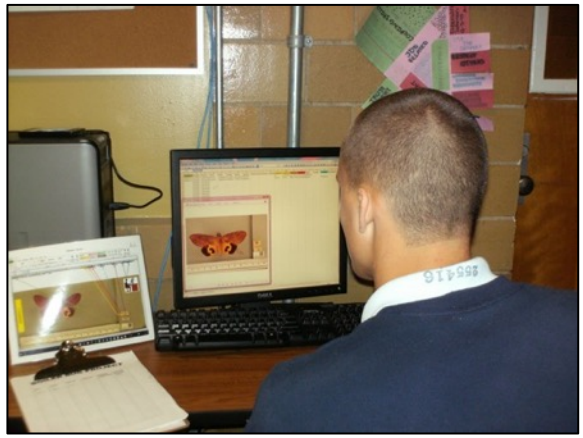


InvertNet Drawer Imaging System “BugEye”

Crowdsourcing with Logansport Indiana Youth Correctional Facility: Boiler Bug

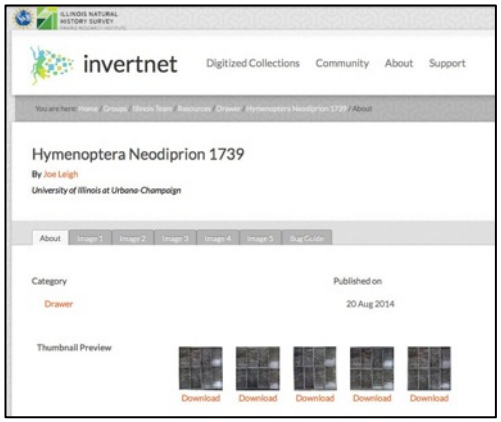


- 3 vacant state hospital buildings
- Security level: low-high
- Average daily population: 125
- Students committed by Indiana courts
- All males, 12-19 years old
- Data transcription (aquatic insects)
- 2,500 + slides databased
- 14 students participated FS2017



Cyberinfrastructure Upgrade

- previous platform used HUBzero/Joomla and was becoming obsolete
  - web application was producing excessive errors which caused the supporting web server to stop responding
  - storage for image data was depleted
  - hard drive failures were occurring on existing storage devices
  - lack of file management tools produced problems in managing large amounts of image data
- upgrades
  - migrate all content to more sustainable and simplified open-source content management system
  - maintain look/feel of current portal but provide additional dashboard with a simplified file manager and metadata editor to facilitate label transcription
  - new responsive layout
  - user tools for file management
  - workflows for editing image resources, and metadata
  - dashboard elements to support system accounts
  - integration of javascript libraries to support image viewers
  - programs for indexing files on storage server



InvertNet Summary

- Progress in digitization efforts
  - 68,388 images captured (20,794 slide boxes, 15,713 vial trays, 6,518 drawers [5 images per drawer]) from 13 collaborating institutions
  - ~ 7.2 million specimens (each high-res image includes up to 1,000 specimens)
- What we have learned
  - high-throughput digitization of insect collections is possible but there are no easy solutions
  - Adapt, adjust, adopt