

Cyber Update

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Your Cyber Team

- **Cyber Specialist**
 - Patrick Clemins
- **Software Developers**
 - Scott Turnbull
 - Morgan Rodgers
- **Technologist**
 - Steve Exler
- **Collaborators**
 - UVM Enterprise Technology Services (ETS)
 - CISL @ NCAR



Our Support Roles



- **Data Collection:** Automate and support the collection and management of data from the soil and lake sensor network
- **BREE Domain Scientists:** Provide software development and data management support for building and calibrating the component models of the IAM
- **The IAM Effort:** Implementing the connectivity between the component models and managing available cyberinfrastructure to effectively run the IAM
- **Collaboration:** Video conferencing and data management / sharing

Core CI Resources - Hardware

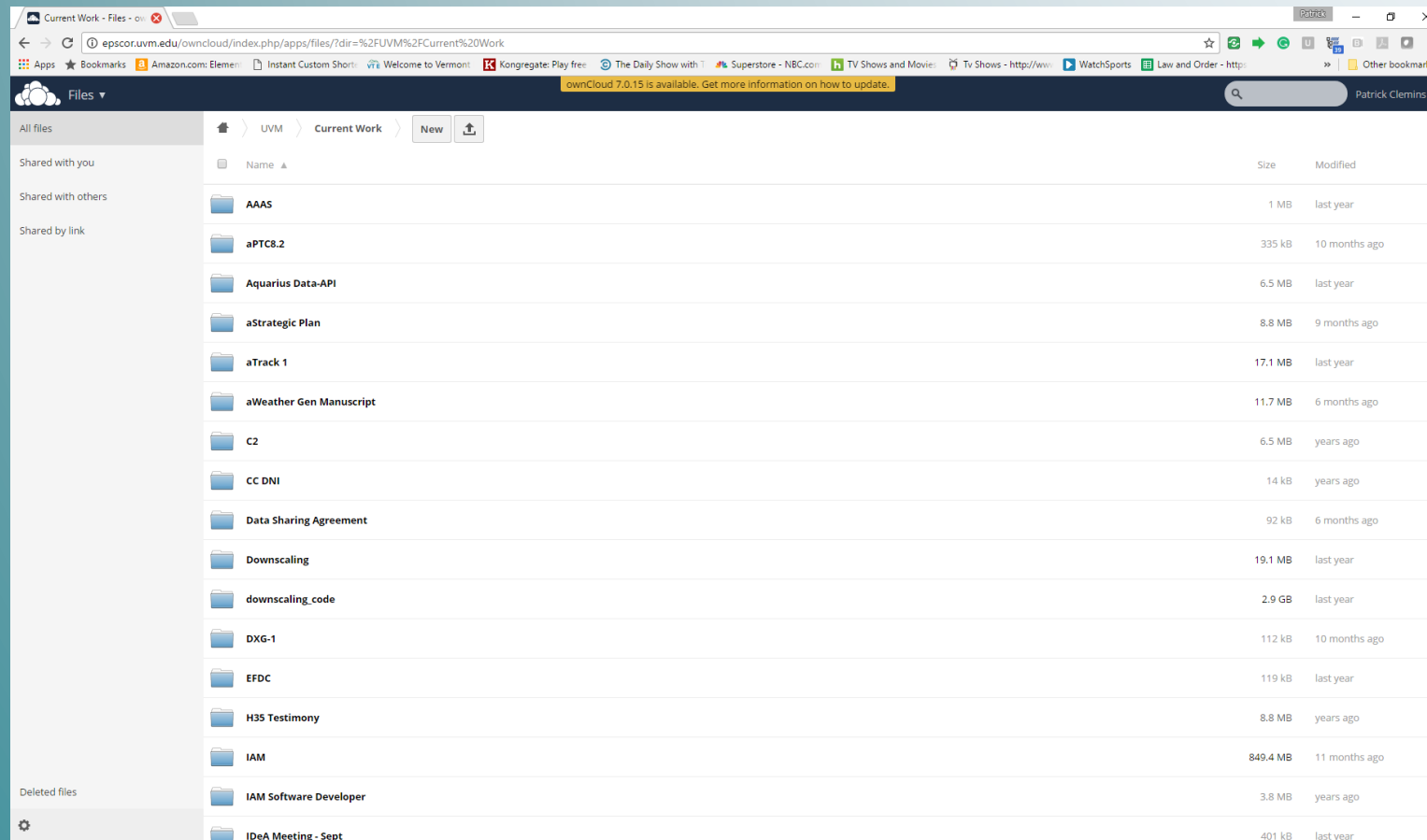


- **Compute**
 - Babbage – Dell PowerEdge compute server
 - 32/64 CPU cores, 256 GB RAM
 - Pascal – NVIDIA DXG-1 GPU compute server
 - 40/80 CPU cores, 512 GB RAM, 28672 NVIDIA CUDA cores (8x Telsa GP100)
 - Cheyenne / XSEDE (i.e. Xstream)
 - National high performance computing (HPC) resources
- **Data Management**
 - Aquarius – Aqaurius hydrology database server
 - Aquariusws (Leopold) – LoggerNet Admin and Aquarius workstation
- **Data Storage**
 - raccfs (Leibnitz) – 100TB network storage

ownCloud

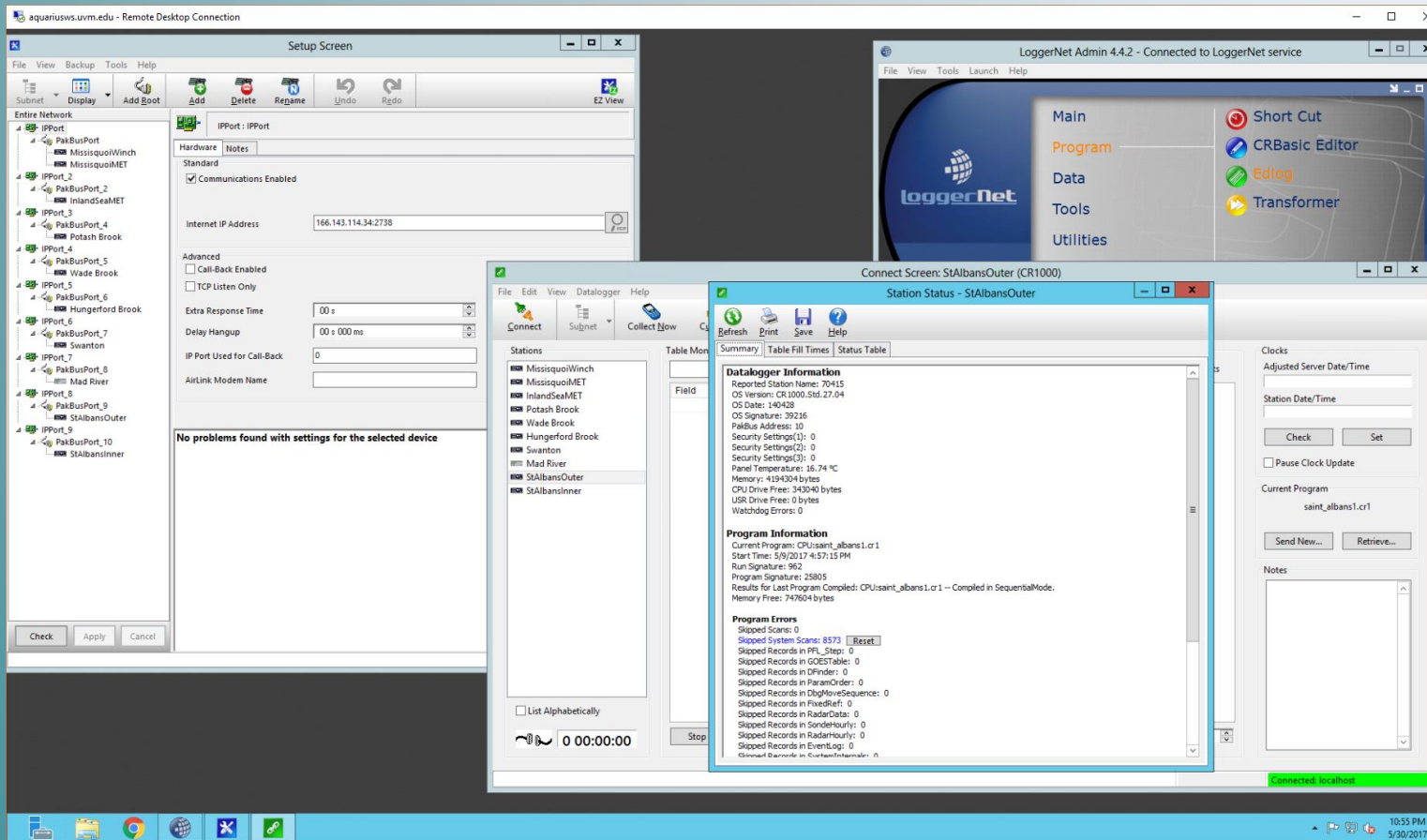


- <http://epscor.uvm.edu/owncloud> and desktop client
- Open-source Dropbox equivalent



LoggerNet

- Remote Desktop to aquariusws.uvm.edu
- Acquires data from stream and lake sensors



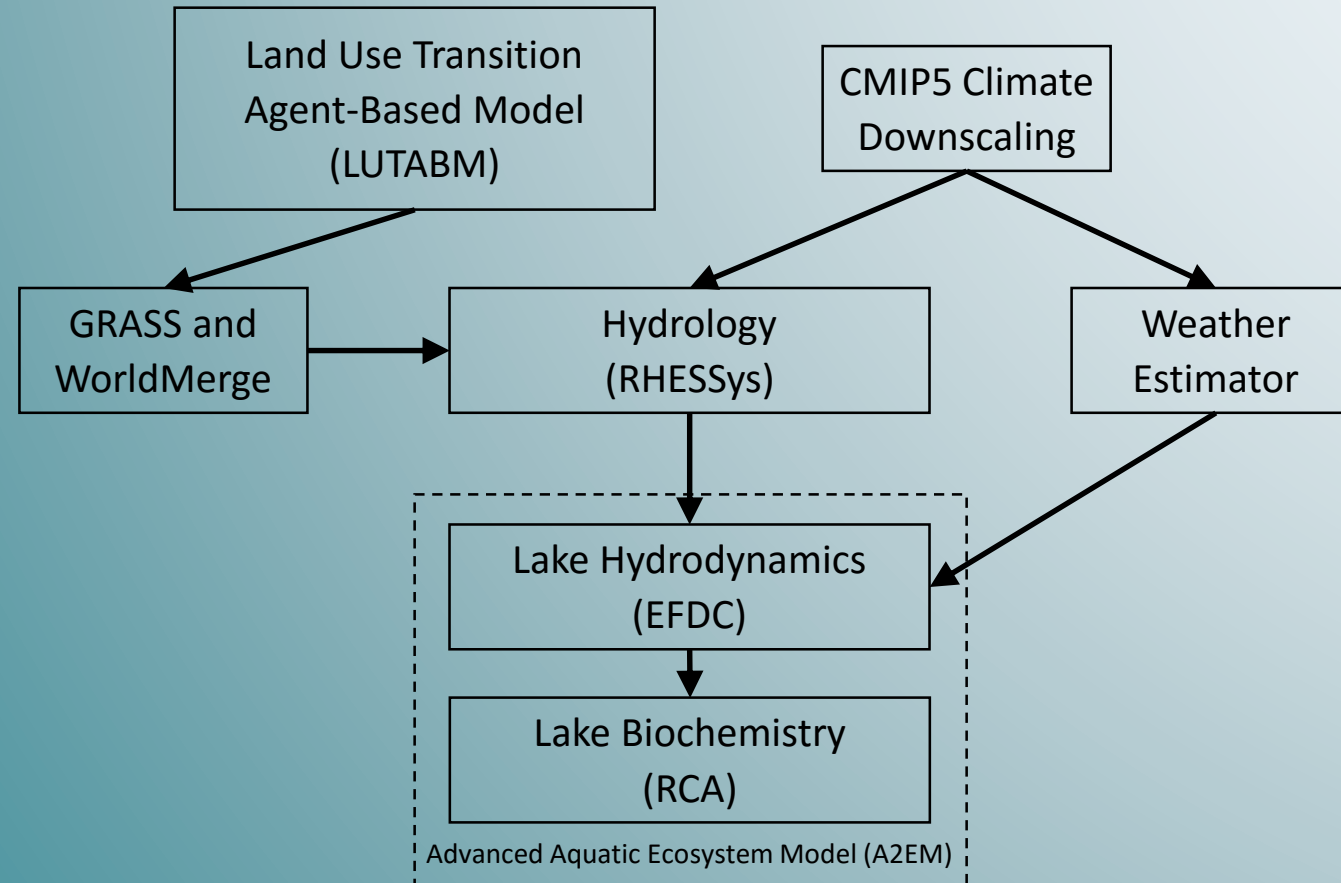
The screenshot displays a remote desktop connection to `aquariusws.uvm.edu`. The main window is the **LoggerNet Admin 4.4.2** interface, which is connected to the LoggerNet service. The interface is divided into several sections:

- Setup Screen:** Shows the configuration for an IP port. The **Internet IP Address** is set to `166.143.114.34-2738`. The **Advanced** section includes options for **Call-Back Enabled**, **TCP Listen Only**, **Extra Response Time** (set to `00 s`), **Delay Hangup** (set to `00 x 000 mo`), and **IP Port Used for Call-Back** (set to `0`). A message at the bottom states: "No problems found with settings for the selected device".
- Connect Screen: STAlbansOuter (CR1000):** Shows the connection status for the station. The **Datalogger Information** section includes: Reported Station Name: 70415, OS Version: CR1000.Std.27.04, OS Date: 140428, OS Signature: 39216, PakBus Address: 10, Security Settings(1): 0, Security Settings(2): 0, Security Settings(3): 0, Panel Temperature: 16.74 °C, Memory: 4194304 bytes, CPU Drive Free: 343040 bytes, USB Drive Free: 0 bytes, Watchdog Errors: 0. The **Program Information** section includes: Current Program: CPU:saint_albans1.cr1, Start Time: 5/9/2017 4:57:15 PM, Run Signature: 952, Program Signature: 25803, Results for Last Program Compiled: CPU:saint_albans1.cr1 -- Compiled in Sequential Mode, Memory Free: 747604 bytes. The **Program Errors** section lists various skipped records and scans, all with counts of 0.
- Station Status - STAlbansOuter:** A window showing a list of stations and a table for monitoring data. The **Stations** list includes: MissisquoiWinch, MissisquoiMET, InlandSeamET, Potash Brook, Wade Brook, Hungerford Brook, Swanton, Mad River, STAlbansOuter, and STAlbansInner. The **Table Monitor** section shows a table with columns for **Field** and **Value**. The **Summary** section shows a timer at `0 00:00:00` and a **Stop** button.

The Windows taskbar at the bottom shows the system tray with the time `10:55 PM` and date `5/30/2017`.

Computational Workflows

- Pegasus + HTCondor
- Build and standardize repetitive computational workflows



Delphi Survey

- <http://css2cc.org>
- Adaptive intervention crowdsourcing and discussion platform



The screenshot displays a web browser window with the URL www.uvm.edu/~epsacor/css2cc/generic.html. The page features the RACC logo (Research on Adaptation to Climate Change) and navigation links: "Back to Main page", "Start / Update your Discussion", and "Instructional Videos".

The main content area is titled "Crowdsourcing Solutions to Climate Change for the Lake Champlain Basin". It includes a header image of a diverse group of people and a blue water splash graphic. Below the header, a note states: "To write comments or rate an intervention, you will need to register." The primary domain is identified as "River Mgt." with a small thumbnail image.

The intervention details are as follows:

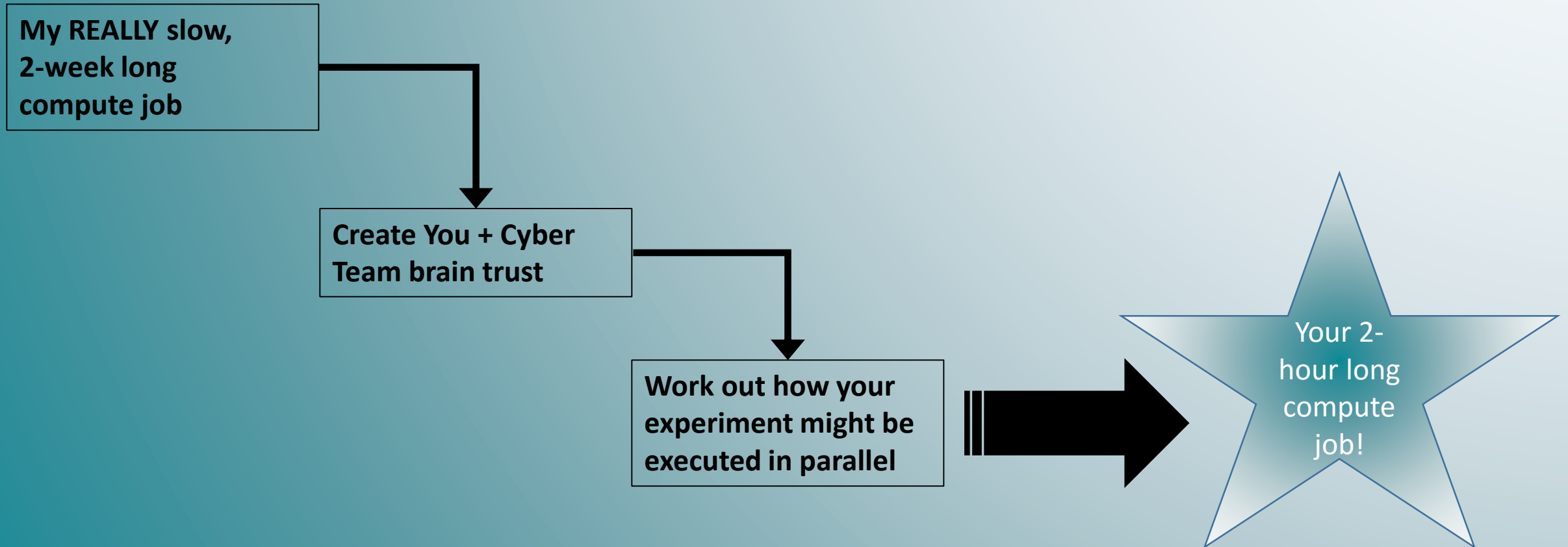
- Created by member:** #69 2014-03-04 08:59:39
- Proper, targeted channel stabilization**
- Scope:** Intermediate+(1-10+yrs.)
- Description / Rationale:** A significant current source of sediment and phosphorus is our eroding stream channels; the majority of which are in a state of disequilibrium. Targeted, appropriate channel stabilization could help reduce this loading and prevent increased loading due to increasing flows from climate change.

Below the description, there is a star rating system (5 stars) and a "Comment" button. The page lists four comments:

- #1** Written by member: #47 2014-03-04 10:51:32 (221)
Are there particular channel stabilization practices that more appropriate? When is it NOT feasible to pursue channel stabilization?
- #2** Written by member: #97 2014-03-05 12:12:13 (230)
Are there any channel stabilization practices that do not adversely affect downstream reaches of the stream?
- #3** Written by member: #179 2014-03-09 22:55:44 (249)
Active channel stabilization should only be considered when all possible passive efforts to give the river the opportunity to recover equilibrium conditions have been fully realized but riverbank erosion remains a major source of sediment.
- #4** Written by member: #184 2014-03-13 12:08:04 (271)
Also consider that stream bank erosion and other instabilities are often a direct result of excessive flows

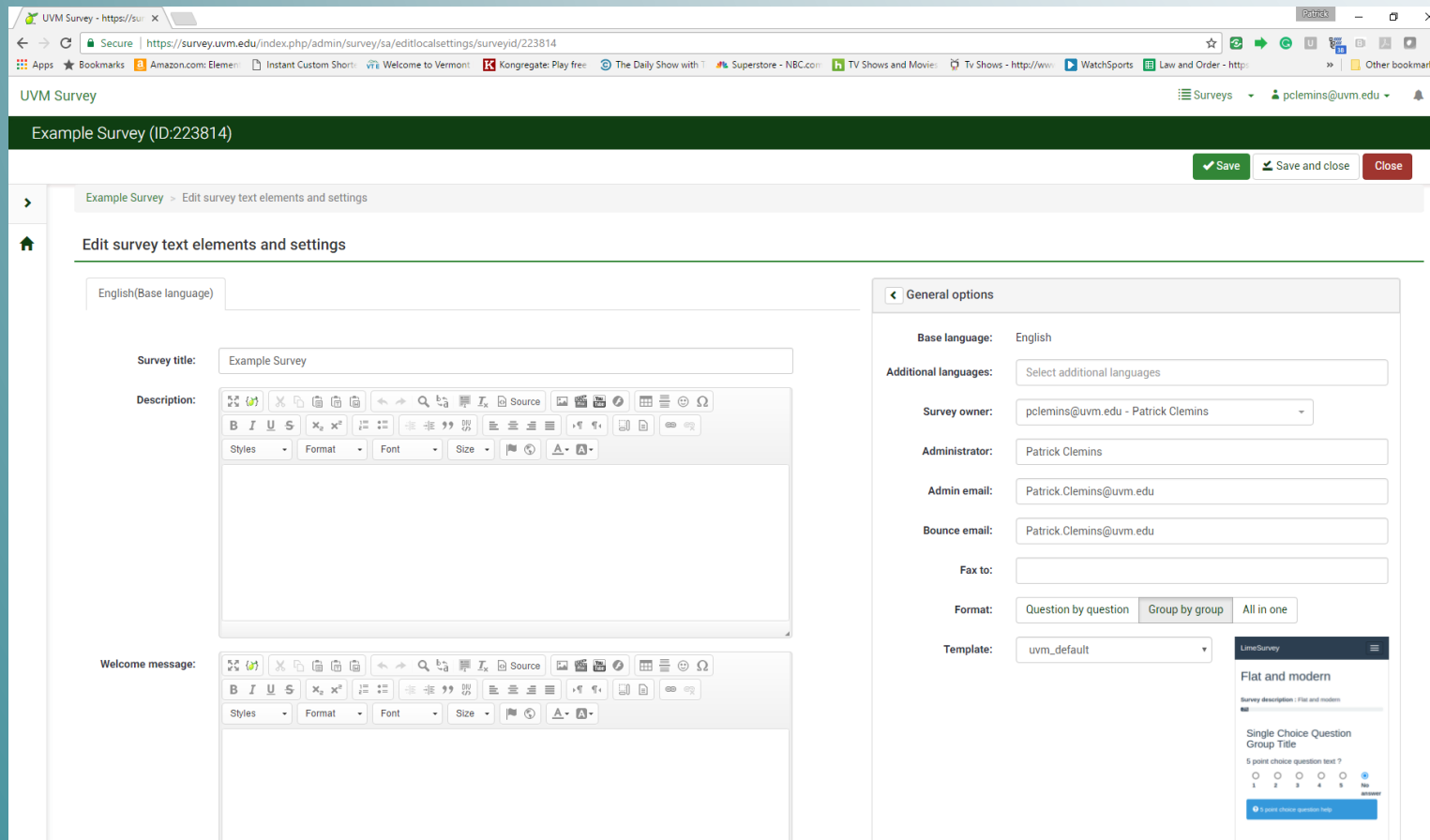
National HPC Resources

- cheyenne.ucar.edu
- 145,152 core National High-Performance Computing Resource



LimeSurvey

- <http://survey.uvm.edu>, <http://survey.uvm.edu/admin> to create
- Create, administer and analyze the results of your own survey



UVM Survey - <https://survey.uvm.edu/index.php/admin/survey/sa/editlocalsettings/surveyid/223814>

UVM Survey

Example Survey (ID:223814)

Save Save and close Close

Example Survey - Edit survey text elements and settings

English(Base language)

Survey title: Example Survey

Description:

Welcome message:

General options

Base language: English

Additional languages: Select additional languages

Survey owner: pclemins@uvm.edu - Patrick Clemins

Administrator: Patrick Clemins

Admin email: Patrick.Clemins@uvm.edu

Bounce email: Patrick.Clemins@uvm.edu

Fax to:

Format: Question by question Group by group All in one

Template: uvm_default

Flat and modern

Survey description: Flat and modern

Single Choice Question

Group Title

5 point choice question text ?

5 point choice question text ?

5 point choice question help

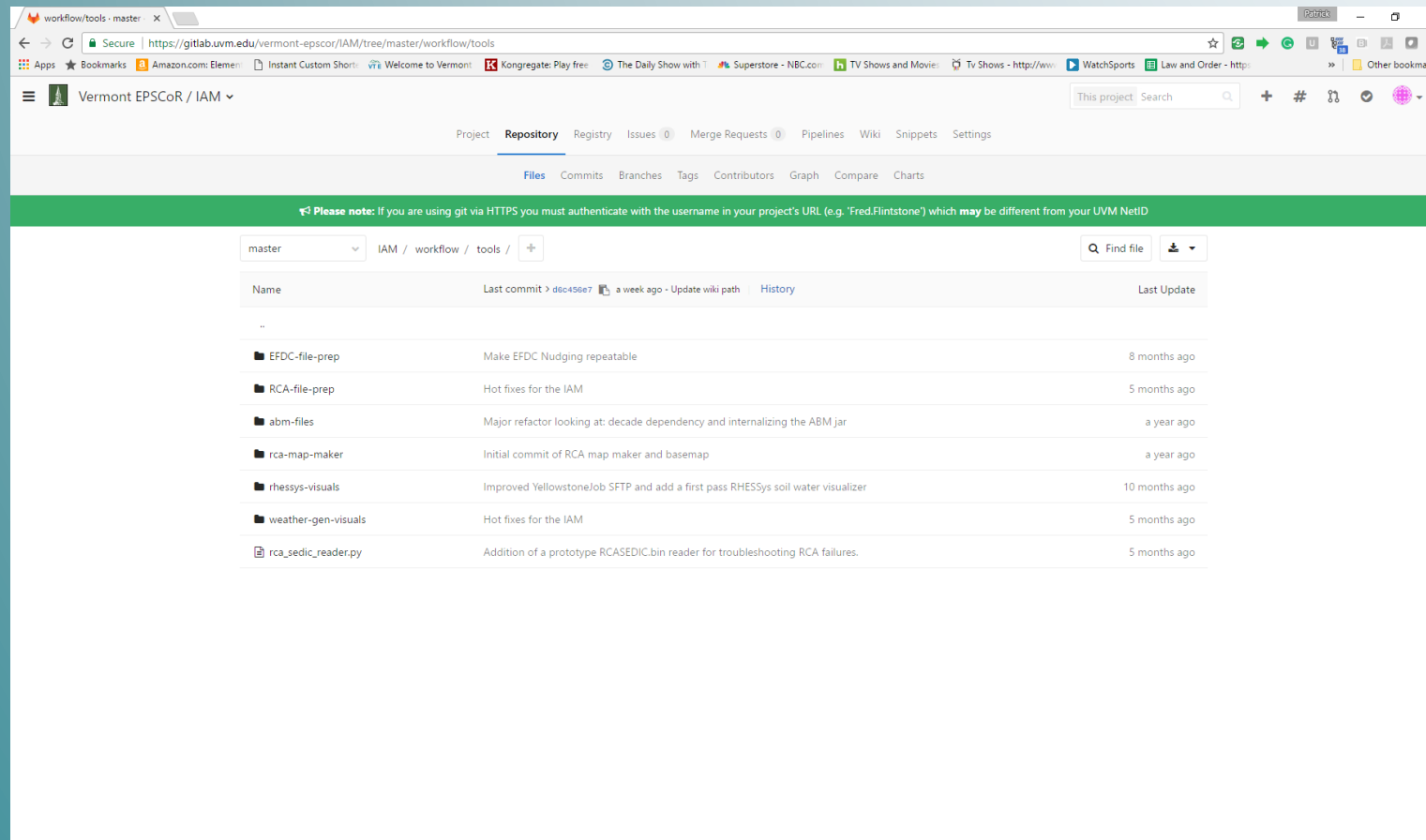
Pascal GPU-Based Processing

- epscor-pascal.uvm.edu
- Docker containers provide deep-learning frameworks



gitlab

- <http://gitlab.uvm.edu>
- Code / Data repository, issue / task tracking, wiki

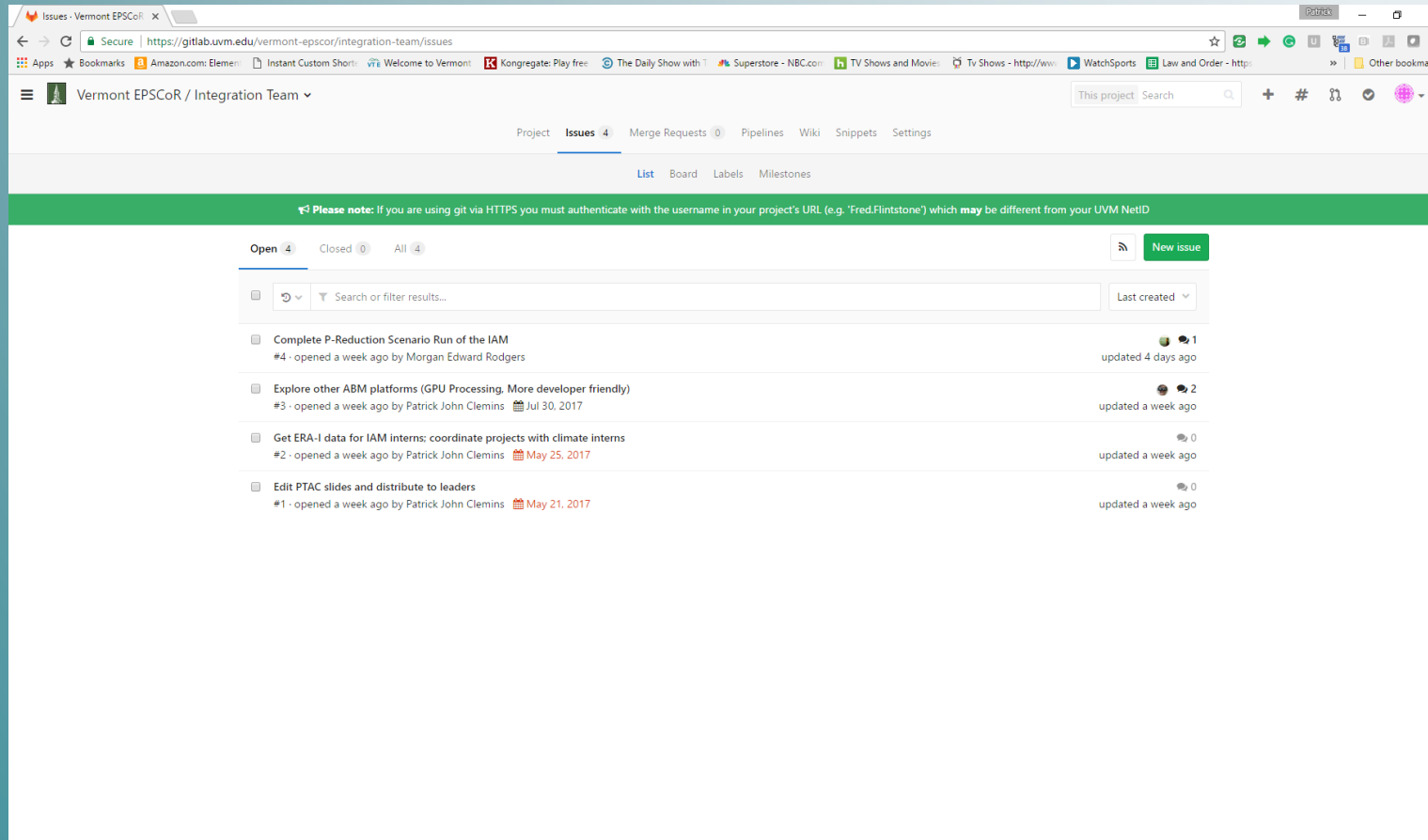


The screenshot shows the GitLab web interface for a repository. The browser address bar displays `https://gitlab.uvm.edu/vermont-epscor/iam/tree/master/workflow/tools`. The page title is "Vermont EPSCoR / IAM". The navigation menu includes "Project", "Repository" (selected), "Registry", "Issues 0", "Merge Requests 0", "Pipelines", "Wiki", "Snippets", and "Settings". Below the navigation, there are links for "Files", "Commits", "Branches", "Tags", "Contributors", "Graph", "Compare", and "Charts". A green banner contains a "Please note" message: "If you are using git via HTTPS you must authenticate with the username in your project's URL (e.g. 'Fred.Flintstone') which may be different from your UVM NetID". The main content area shows a breadcrumb "IAM / workflow / tools" and a "Find file" search box. A table lists the repository's contents:

Name	Last commit > d6c456e7 a week ago - Update wiki path History	Last Update
..		
EFDC-file-prep	Make EFDC Nudging repeatable	8 months ago
RCA-file-prep	Hot fixes for the IAM	5 months ago
abm-files	Major refactor looking at: decade dependency and internalizing the ABM jar	a year ago
rca-map-maker	Initial commit of RCA map maker and basemap	a year ago
rhessys-visuals	Improved YellowstoneJob SFTP and add a first pass RHESys soil water visualizer	10 months ago
weather-gen-visuals	Hot fixes for the IAM	5 months ago
rca_sedic_reader.py	Addition of a prototype RCASEDIC.bin reader for troubleshooting RCA failures.	5 months ago

gitlab

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- Code / Data repository, issue / task tracking, wiki

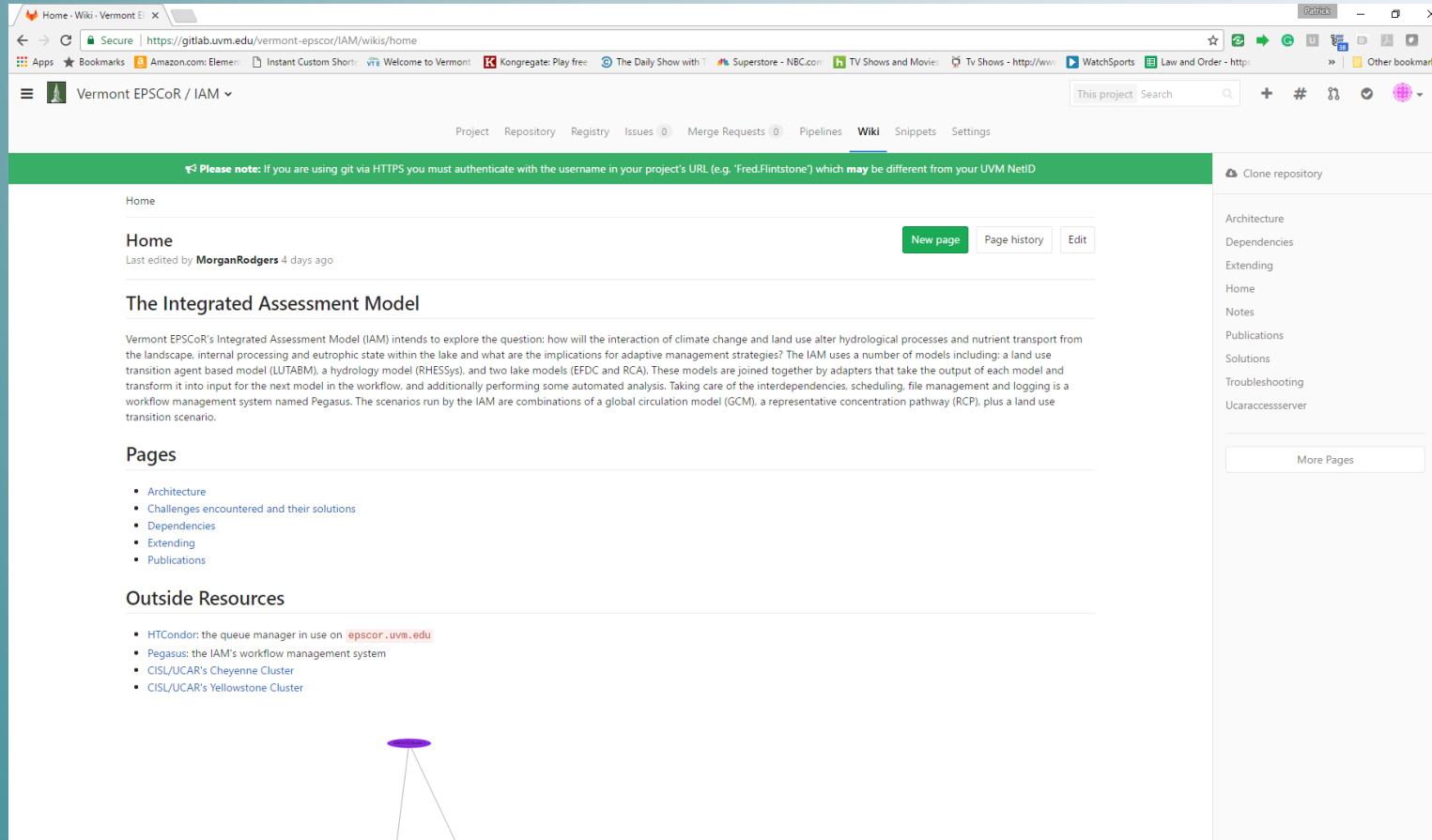


The screenshot shows the GitLab web interface for the 'Vermont EPSCoR / Integration Team' project. The browser address bar shows the URL <https://gitlab.uvm.edu/vermont-epscor/integration-team/issues>. The page header includes navigation links for Project, Issues (4), Merge Requests (0), Pipelines, Wiki, Snippets, and Settings. A green banner contains a note: 'Please note: If you are using git via HTTPS you must authenticate with the username in your project's URL (e.g. "Fred.Flintstone") which may be different from your UVM NetID'. Below the banner, there are filters for 'Open' (4), 'Closed' (0), and 'All' (4), along with a 'New issue' button. A search bar is present with the text 'Search or filter results...'. The main content area displays a list of four open issues:

Issue Title	Opened	By	Updated
Complete P-Reduction Scenario Run of the IAM	#4	Morgan Edward Rodgers	updated 4 days ago
Explore other ABM platforms (GPU Processing, More developer friendly)	#3	Patrick John Clemins	updated a week ago
Get ERA-I data for IAM interns; coordinate projects with climate interns	#2	Patrick John Clemins	updated a week ago
Edit PTAC slides and distribute to leaders	#1	Patrick John Clemins	updated a week ago

gitlab

- <http://gitlab.uvm.edu>
- Code / Data repository, issue / task tracking, wiki



The screenshot shows a web browser window displaying the GitLab Wiki page for the Vermont EPSCoR's Integrated Assessment Model (IAM). The browser's address bar shows the URL <https://gitlab.uvm.edu/vermont-epscor/IAM/wikis/home>. The page features a green navigation bar with a warning message: "Please note: If you are using git via HTTPS you must authenticate with the username in your project's URL (e.g. 'Fred.Flintstone') which may be different from your UVM NetID". Below this, the page title is "Home" and it was last edited by MorganRodgers 4 days ago. The main content area is titled "The Integrated Assessment Model" and contains a paragraph describing the IAM's purpose and components. A "Pages" section lists links to Architecture, Challenges encountered and their solutions, Dependencies, Extending, and Publications. An "Outside Resources" section lists links to HTCCondor, Pegasus, CISL/UCAR's Cheyenne Cluster, and CISL/UCAR's Yellowstone Cluster. A right-hand sidebar contains a "Clone repository" button and a list of page links including Architecture, Dependencies, Extending, Home, Notes, Publications, Solutions, Troubleshooting, and Ucaraccessserver. A "More Pages" button is also present at the bottom of the sidebar.

Data Sharing and Archiving



- Data Sharing Policy reviewed annually
 - Data Sharing Agreement Template available
- CI Resources are backed up via existing ETS systems and policies
- Archiving
 - Environmental – CUAHSI
 - Social Systems – ICPSR
 - Model-Generated – UVM

BREE Strategic Plan



- Linkages #9 – IAM Interconnections and Feedbacks
 - Collaboration with domain scientists
 - Implementation of data transfers between CI resources
- Linkages #10 – Computation
 - Expand Pegasus workflow for new domain models
 - Modify Pegasus workflow to run on UCAR’s new HPC resource, Cheyenne
 - Enable GPU processing capability via Pascal and potentially, XSEDE resources if necessary

Discussion

Cyberinfrastructure