

Migrating Servlets to JSPs *Refactor Phase 1B* **Functional Specifications**

Version 8.0
June 5, 2007

Introduction

MyInfoVault (MIV) is the academic merit and promotions system for the University of California, Davis.

The current data entry process for the MIV system requires the processing of individual servlets for every form submission, including additions, deletions, updates, previews and resequencing of data. Servlets are programs that handle both the business logic and the display logic for a web page. The submission processes in MIV unnecessarily duplicate servlet code and make future enhancements or ease of updates to the MIV data entry process slow and error prone.

This implementation will convert the business logic to servlets and the page display logic to JSPs. Replacing the current implementation of servlets in the MIV data entry process with Java Server Pages (JSPs) was identified as the solution for providing the foundation for streamlining current and future development, reducing data integrity issues, providing an improved user experience, and improving system performance.

The advantages of using JSPs are that they are document-centric. Servlets, on the other hand, look and act like programs. Using JSPs enables developers to separate programming logic from page design through the use of components that are called from the page itself. Therefore, implementing JSPs provides the ability to easily change the text and visual design of a page without requiring changes to the program logic itself.

JSPs mingle content (pure data) with presentation in the same way static HTML does. JSPs allow tags and inline Java code to be inserted into an otherwise normal HTML page. When the JSP page is requested, the resulting code is executed in a Servlet engine and the results are inserted right into the output HTML. A typical JSP page contains static HTML/XML components, JSP tags, optional snippets of Java code called scriptlets and additional functionality can also be achieved on the client side, using JavaScript. The power of JSPs is that they are server-based and provide a framework for Web application development. JSP technology adheres to the Write Once, Run Anywhere methodology.

Definitions

JSP (*Java Server Page*)

A server-side technology. JSPs have dynamic scripting capability that works in tandem with HTML code, separating the page logic from the static elements (the actual design and display of the page) to help make the HTML more functional (i.e., dynamic database queries). A JSP is translated into a Java servlet before being run, and it processes HTTP requests and generates responses like any servlet. However, JSP technology provides a more suitable way to code a servlet. Translation occurs the first time the application is run. JSPs are not restricted to any specific platform or server. JSPs are reusable, cross-platform components that have built in security against system crashes, memory leak protection, and contain customizable tags.

Servlet

A small program that runs on a server. The term usually refers to a Java applet that runs within a Web server environment, servicing client requests forwarded to it through the server.

Bugs/enhancements to be included in this Refactor Phase.

MIV-17 Ticket Closed. Drag and drop resequencing is being implemented instead, and is a better solution.

MIV-17 Add sort by chronological date to resequence tool

MIV-54 Deferred to Phase F. Letters since the majority of PDF uploads are done for letters.

MIV-54 Add error or warning when partial file names are entered into file upload utility

1. **MIV-70** Consolidate "Update" and "Form" classes into one class
2. **MIV-71** Reduce code redundancy and "cut and paste" coding
3. **MIV-88** Grants completed and active did not appear in packet.
4. **MIV-121** Bug in resequence utility for publications that had inadvertently doubled up sequence numbers.
5. **MIV-147** When editing publications, user has to go back and find which publication to edit next.
6. **MIV-148** Student Advising Typos

7. **MIV-162** Presentations needs sort order by year, month, day.

MIV-165 Deferred to Phase II.
MIV-165 Prior Bugzilla issue #B18: Add URL field to Evaluations screen and report
8. **MIV-175** Prior Bugzilla issue #28: Improve UI of Resequencing of pub lists; drag and drop?
9. **MIV-177** Prior Bugzilla issue #30: University Extension: add drop down with 4 qtrs; add fractional Units
10. **MIV-182** Prior Bugzilla issue #36: Add "Trainer" to Grant dropdown
11. **MIV-194** Prior Bugzilla issue #B63: Consolidate Grant data entry screens
12. **MIV-203** Footnote, notation, and line changes
13. **MIV-223** Research Grants/Contracts: Unawarded dropdown menu change for Investigator roles
14. **MIV-232** Pubmed Download Default Yes/No Selector
15. **MIV-235** Thesis Supervision (Teaching and Advising Record) required fields
16. **MIV-260** Add Collaborator role to dropdown menu for Research Grants/Contracts for Completed, Active, Pending, Unawarded
17. **MIV-262** Use radio buttons for mutually exclusive choices in Thesis Supervision
18. **MIV-279** Remove Packet options on Publication Format Option screen.

MIV-280 Deferred to Phase E. Workflow
MIV-280 Relocate Highlight name options on Publication Format Options screen.
19. **MIV-312** Administrative Activities cannot enter just one year and have it appear without a hyphen after it.
20. **MIV-338** Alternative Media "other" checkbox is not required to be checked if you enter data in the corresponding "other" textbox.
21. **MIV-339** Transferring publications with "author" status change to "co-author" when transferred.

Servlets to JSP Requirements

- The requirements stated below are solutions to existing problems in order to illustrate the gains in data integrity, usability, ease of development, performance, and security.
- The system will be refactored with the following requirement assumption:
Users of the MIV system will have/or obtain a Kerberos Account at: <http://ComputingAccounts.ucdavis.edu>

| Problem | Solution |
|--|---|
| System Security and Availability | <ol style="list-style-type: none"> 1. Strict adherence to UC Davis Cyber-Safety requirements (Level 1 and 2). 2. Use of UC Davis Distributed Authentication services for sign on. This will provide the ability to profile Users based on their Kerberos ID. 3. For system-to-system communication over the Internet, the HTTPS protocol must be used to protect communication confidentiality at all times. 4. System will not recommend browser "bookmarking" of any page containing role management functionality. 5. System will not recommend multiple browser windows to be opened that contain role management functionality. 6. System will implement technologically independent of computer platforms and transmission protocols. 7. System must support an audit trail and application logging. 8. Audit trails must record the user, whose role is managed, data handled, and timestamps. 9. User authorization levels must be supported to manage access to system functions and sensitive data. |
| Privacy | <ol style="list-style-type: none"> 1. Privacy requirements ensure that sensitive information is not accessible to unauthorized Users. 2. Privacy concerns must be addressed to protect faculty and reviewers from fraudulent or unauthorized access of sensitive data. 3. The confidentiality and integrity of sensitive data must be protected. |
| User Interface/ Graphic Design Standards | <ol style="list-style-type: none"> 1. The design and development of this system should be compliant with all relevant guidelines established by Section 508 which requires that Federal agencies' electronic and information technology be accessible to people with disabilities. More information about Section 508 is available at www.section508.gov 2. System front-end web user interface should use University color palette and comply with University supported browsers. 3. System front-end web interface will display the UC Davis logo on every page. The image will be a link back to the UC Davis home page. 4. System front-end web interface will display a "Contact Us" and "Help" link on every page. 5. System will use a custom MIV cascading style sheet for design and display consistency. |
| Data Entry Form Performance | <ol style="list-style-type: none"> 1. Update the implementation of all data entry screens from Servlets to JSPs. Each individual data entry form containing its own servlet will be consolidated into one JSP whenever possible (see "Publications" or "Research Grants" navigation changes in "Matrix A: Navigation Menu changes and Form Merges" below). 2. Perform basic field data validation prior to form submission, including: <ul style="list-style-type: none"> • Required fields (including PDF upload fields) that are empty to prevent a form submit rather than raise an error after form submission. • Numeric fields only allow numbers to be entered. • Dates are valid and within allowed range(s). Dates will be standardized and may include dropdown menu options for month, quarter, etc., where applicable. 3. Perform data validation on the server to guard against maliciously constructed form submissions such as SQL injection and cross-site scripting. 4. Avoid code duplication by reusing code and database queries from the new XML based packet builder (Refactor Phase A: Packet Creation Changes (Move to XML), where possible). 5. Create web pages using standards-compliant HTML 4.x and/or XHTML 1.x using an appropriate DOCTYPE declaration. 6. System will use consistent terminology for all instructions and data entry headings. 7. System will have ability to resequence data, within individual calendar years, by dragging and dropping individual publication entries. 8. System will have ability to include multiple symbols, as well as lines, before or after and include Publication footnotes and notations in a separate interface than the add or edit citations screen. 9. Data entry for "Publications" and "Research Grants" will use one JSP each. 10. Publication types will be able to be updated/changed/transferred on each publication edit screen. 11. Add/Edit/Delete functionality for "Publications" will all be accessible from the same web page. 12. All publication fields for all publication types will appear on one page. Therefore, along with "Year", "Title", etc., "Editors", "Publisher", "City" and "URL" will appear on the publications page for all |

| | |
|---|---|
| | <p>publication types (Journals, Books, etc.). Decision: 3/22/07 via email.</p> <ol style="list-style-type: none"> 13. "In Press", "Submitted", "In Preparation" citation status' will be displayed in listing order after "Published", and should not have a number assigned to them until after they are "Published". 14. Add/Edit/Delete functionality for "Research Grants" will all be on the same web page. <ul style="list-style-type: none"> • All grant fields for all grant types will appear on one page. Therefore, along with "Grant Amount", etc., "Start Date", "End Date", and "Submitted Date" will appear on the grants page. Decision: 3/22/07 via email. • All Grants will have an option for a Status of "None" (primarily for Gifts or Training). 15. All Grants will be sorted by "Status" (e.g., Active) and "Type" (e.g., Research) in the Packet. 16. Presentations will be sorted by Year and Month. Day will be an available option. Decision: 3/27/07 via email. 17. Thesis Supervision default selections for the dropdowns will be Committee: "Member", Degree Type: "Masters", and Degree: "In Progress". Decision 5/8/07 via email. 18. "RESEARCH: Additional Information" will be titled "Publications Additional Information" in the navigation menu and enter data forms since the data appears at the end of the Publications section in the Packet. 19. Link to PubMed download will be available from the Journal publication page only. 20. Author/Co-Author radio buttons will be removed from Book Chapters. Decision: 6/5/07 via email. 21. Consistent use of web form standards including dropdown menus, radio and checkboxes (E.g., radio buttons will be used for mutually exclusive options). 22. Data Entry confirmation screens or windows will be displayed for additions/deletions/changes. 23. System will have ability to resequence "Additional Information" headings. 24. System will have ability to add "special characters" as well as bold, italic and underline format options from the add or edit citation screens. 25. The main enter data screen will be removed and all enter data forms will be accessible from the top navigation menu. 26. Due No. 17 above, all gray "Back" buttons will be removed from enter data screens, and the Enter Data link on the main MIV links page will be removed, all Enter Data pages since all pages will be accessible from the top navigation menu (see below). 27. All of the Data Entry "Preview" areas will display the data exactly how it will appear in the Packet. |
| <p>Top Header / Navigation Menu Usability</p> | <ol style="list-style-type: none"> 1. System will provide one global top navigation menu on all screens. 2. Top header will contain links to "Edit My Account", "Help" and "Contact Us". 3. Navigation Menu will be updated to consolidate similar form groups, improve usability and set a foundation for ease of future development. See "Matrix A: MIV Data Entry Navigation Menu changes". 4. Navigation menu will have a link to the Special Character Interface. The link will only work on appropriate pages (Enter Data, Letters), otherwise it is viewable, but does not work. |

Implementation

A Java Server Page is a combination of page markup ([X]HTML) and special tags and/or code. As much as possible code will be kept out of the page and confined to the server and the implementation of the special tags ("JSP Tag Libraries"), with the goal of zero code present in the page.

Much of the repetitive "cut-and-paste" code in the current system will naturally fall away since the pages will no longer be built in code. The distinct pages for create vs. update will be eliminated. Other duplicated code will be eliminated or moved to shared utility classes. A form submission or "Save" will still send the form contents—the record being created or edited—to a servlet for processing. A single form will be used for both creating new and editing existing records. Page reloads will be minimized where possible by posting these submissions "in the background" using AJAX-style methods. Data entry forms and other data manipulation will be made to behave more like a desktop application through the use of available Javascript toolkits (specifics TBD during development) along with custom Javascript code that runs in the client browser.

Functional Areas

The major functional areas of MIV are:

- Data Entry and Maintenance (Entering and revising data such as Journal Articles written or Courses taught.)
- Packet Design

Selecting and arranging the data that was entered for inclusion in the Packet:

- Packet Submission and Review (To be resolved in the Refactor E: Improve Workflow and Workflow Monitoring phase)
- CV Design & Maintenance
- NIH Biosketch

Data Categories

The different types of data stored in MyInfoVault have varying requirements with respect to the features needed to maintain the data. "Publication" data, for example, requires that entries can have footnotes, lines, and notations added to them, while "Courses Taught" is straightforward data entry. Some areas are used primarily for initial setup, such as the "Personal Information" and "Areas of Interest" while others are meant for the ongoing collection of information over time.

Data to be entered and managed in the Servlets to JSP conversion falls roughly into the following areas:

1. Initial Setup: Personal, Education, Employment
2. Ongoing: Extending Knowledge, Research Grants, Packets, Service, Publications, Teaching

The goal is to make data entry for the MIV role management system as easy as possible while making it difficult for data entry errors or inconsistent data to populate the MIV database. As a result of the servlets to JSP conversion, it is the logical next step to analyze and reorganize the MIV "Enter Data" pages to provide a consistent look and feel, terminology and way data is presented (checkboxes, dropdown menus, etc.).

These changes to all of the data entry web pages require a refactoring of the underlying code base and database structure to handle JSPs and the user interface will be upgraded to reflect the changes in the backend.

The new data entry interface will require user notification and training.

MIV system functionality/user interfaces that will be changed:

All "Enter Data" screens, the "Design Packet – Lines/Footnotes/Notations" screen, the Design Packet- Extensive screen, and the top level "static" html screens, such as the Log In, Help, and outage screens.

MIV system functionality/user interfaces that will not be changed:

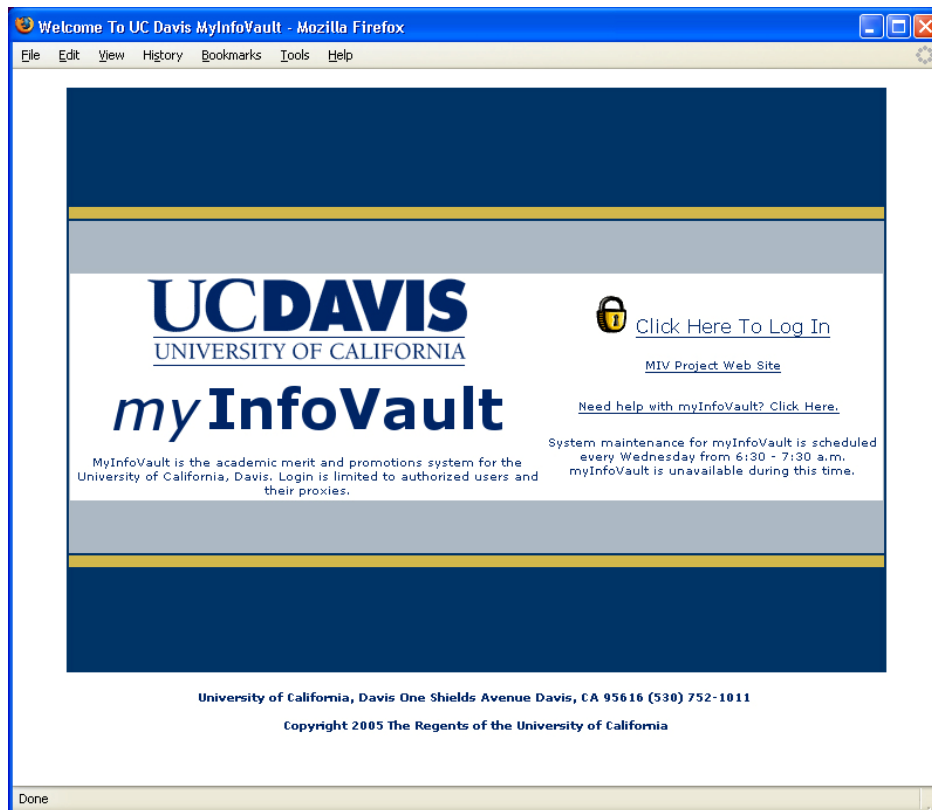
All Role Management, Electronic Signatures, all packet Workflow and Letters screens, including: CV Online, Packet Online, NIH Biosketch, Review Packets, Faculty Access List, Member List, Member list by Selected Dept., Merit/Promotion/Appraisal Packets, Assign Packet Reviewers, List School Packets, Completed Packet Archive, EDMS Packet Utility, Access Authorization, Send my Packet to my Department, Email my CV, Publish my CV on the Web, Add a New User, Electronic Signature, and Access Member's Account.

User Interface Design Updates

The “look and feel” and top header navigation for all data entry forms will be updated as follows:

New Login page

The login will receive an updated look and feel (all existing data/links will remain available).




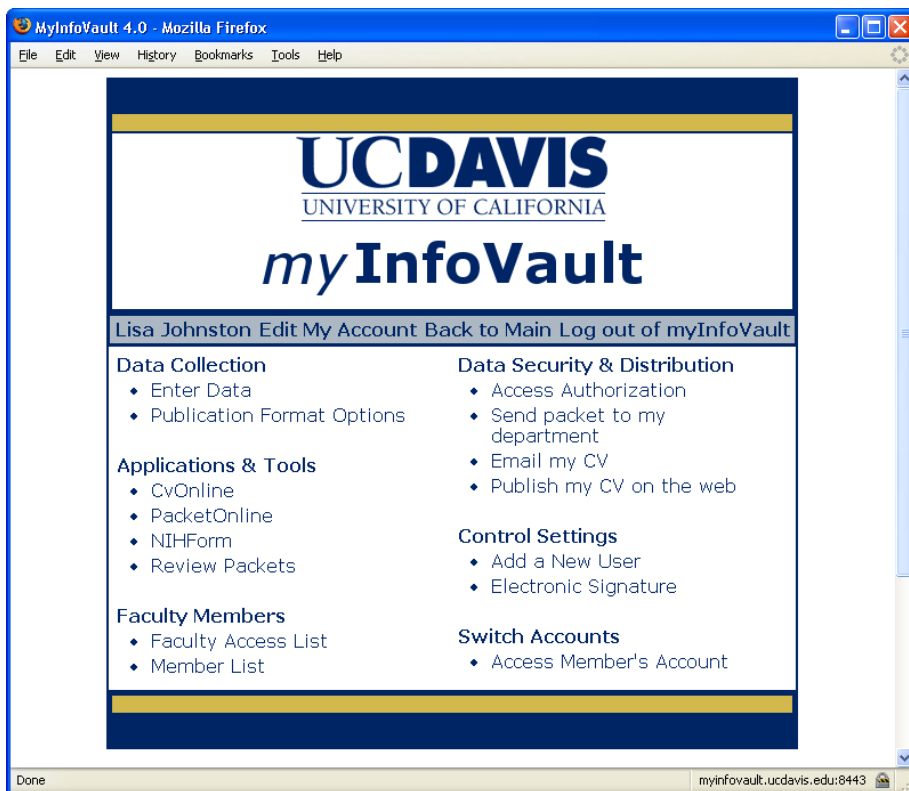
Current “log in” screen



New “log In” screen prototype

New Top Header and Navigation

1. The MIV home page will receive an updated look and feel (all existing data/links will remain available).
2. Top header area will be the same on all Data Entry pages and include links to "Edit My Account", "Help", and "Contact Us".
3. An updated navigation bar (with gold background) will be accessible from all data entry pages.
4. All data entry forms will be accessible from the "Enter Data" tab in the top navigation bar.
5. MIV User (who is currently logged in) has their name displayed in the top navigation menu (on the right) of all "Enter Data" screens.
6. "Return to Admin" button will only be viewable when a User has "switched accounts", and will be located below the User's name in the top navigation menu on the right side of the screen.
7. "Switch Account" access will be accessible from the "Select Faculty Account" link located under the "Data Collection" header.
8. "Edit my Account" link will be accessible in the top header area next to "Help" and "Contact Us".
9. Link to Special Character Interface  appears in top navigation menu on each page (to the left of the MIV User's name).
10. Header navigation bar on all Enter Data screens will be updated to include the following tabs: Home, Enter Data, CV Online, NIH Biosketch, and Packet Online.



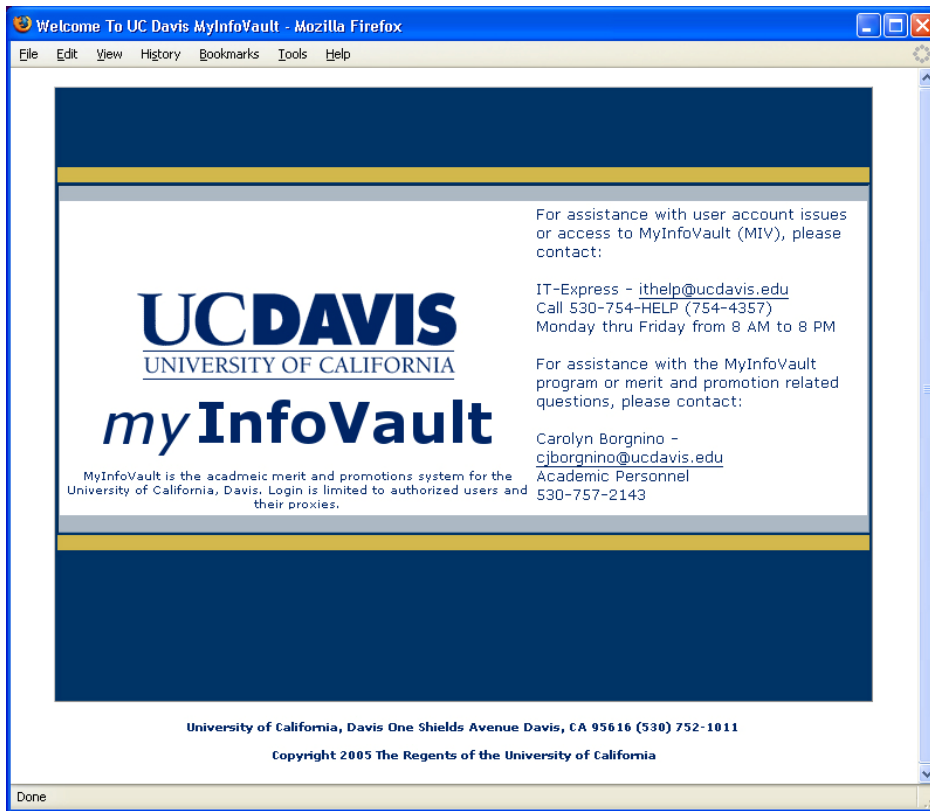
Current "Main" navigation screen



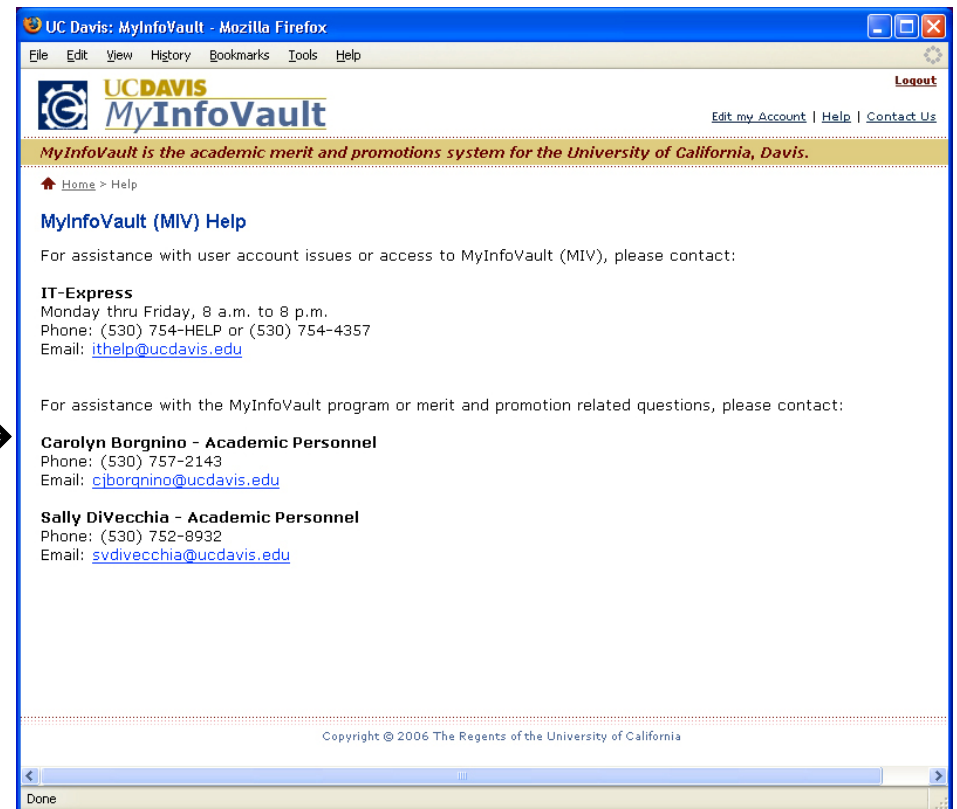
New "Main" navigation screen prototype

New Static pages

Static web pages, like the MIV help page, will receive a new uniform look and feel (all data/links will remain available).



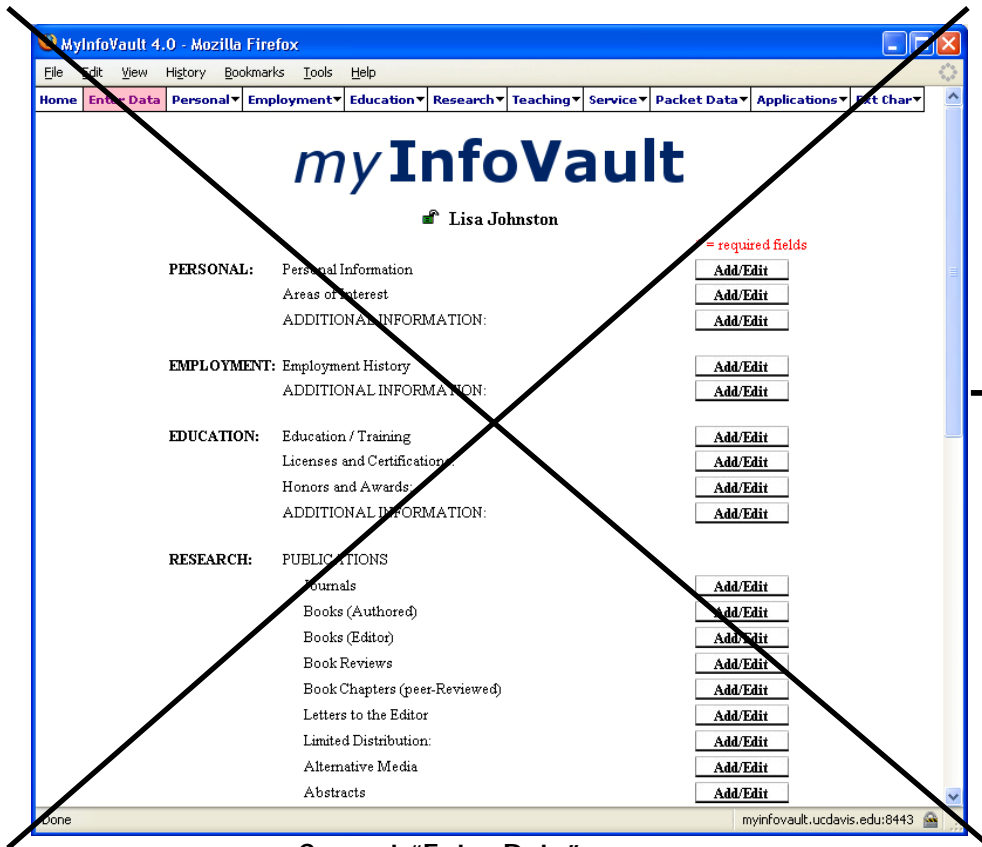
Current "Help" screen



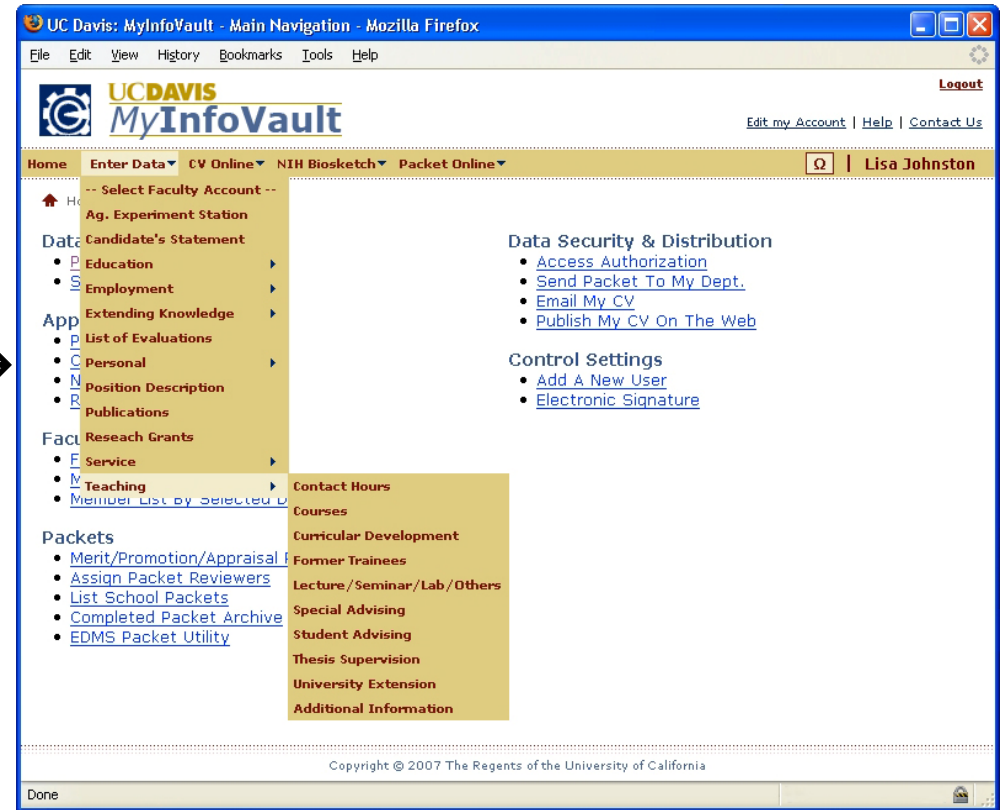
New "Help" screen prototype

New Enter Data Navigation Tab

1. Only the "Enter Data" tab and its corresponding links will be changing (see "Matrix A: MIV Data Entry Navigation Menu changes" below) during this Refactor Phase, all other tabs (CV Online, Packet Online, etc.) will remain the same as before.
2. The current "Enter Data" screen will be replaced by the top navigation menu that is accessible from all enter data forms.
3. All Data entry forms will be accessible via the "Enter Data" tab in the top header navigation menu.
4. "Select Faculty" link (Switch Account) is available from the "Enter Data" tab.
5. "Publications" and "Research Grants" tabs have had all corresponding forms merged.
6. All navigation tabs are by default, alphabetized.



Current "Enter Data" screen



New "Enter Data" top navigation menu prototype

Matrix A: Navigation Menu changes and Form Merges

To facilitate the servlets to JSP conversion, the following changes will be implemented to enhance and consolidate the usability of the Data Entry navigation menu that will be displayed at the top of each Data Entry screen (Image 1):

*Publications tab will merge the following forms into one (i.e., there will be one "Publications" data entry screen with all publication fields available for each publication type), but publication types will remain as individual links on the main navigation menu:

- Abstracts
- Alternative Media
- Books (Authored)
- Books (Edited)
- Book Reviews
- Book Chapters (peer-Reviewed)
- Journals
- Letters to the Editor
- Limited Distribution
- Additional Information (NEW FEATURE)
- Presentations (relocated from Service tab)

The following "Packet Data" forms will be relocated to "Teaching":

- Thesis Supervision
- University Extension
- Student Advising
- Special Advising
- Curricular Development
- Contact Hours

Research Grants will merge the following forms into one (i.e., there will be one "Research Grants" data entry screen with a dropdown menu option to select Satus: Completed, Active, etc. and Type: Research, Gift, etc.):

- Completed
- Active
- Pending
- Unawarded
- Gift
- Teaching and Training
- Research Other Support

The following "Packet Data" menu items will be relocated to the top level of the "Enter Data" menu:

- Agricultural Experiment Station
- Candidate's Statement
- List of Evaluations
- Position Description: (federation title only)

* Individual fields versus textbox entry for publications will be addressed in a separate Requirements Specification.

New "Grants" Add/Edit screen

UC Davis: MyInfoVault - Main Navigation - Mozilla Firefox

File Edit View History Bookmarks Tools Help

UC DAVIS MyInfoVault Logout

Edit my Account | Help | Contact Us

Home Enter Data CV Online NIH Biosketch Packet Online Lisa Johnston

Home > Grants List > Grants Form

Adding "Grants" for Lisa Johnston

Lisa Johnston

Type: Research Status: [dropdown]

Grant/Contract Title: [text input]

Funding Agency: [text input]

Grant Number: [text input] Amount: [text input]

Start Date: [text input] End Date: [text input]

Submitted/Resubmitted Date: [text input]

Role: Principal Investigator [dropdown]

PI Name: [text input]

Purpose/Goal: [text area]

Save Cancel

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Done

- All "Grants" screens consolidated into one screen.

- Dropdown menus for "Type" and "Status".

New Resequencing

1. Resequence data by dragging and dropping individual publication entries within solid line boundaries.
2. Dotted lines display individual citations while solid lines can show groups of "Year", "Month", etc.
3. Any citation can be resequenced that is in between solid lines.
4. Citations that cannot be resequenced (e.g., only have one citation per Year), are grayed out and are unavailable for resequencing.

New "Resequencing" screen

UC Davis: MyInfoVault - Main Navigation - Mozilla Firefox

File Edit View History Bookmarks Tools Help

UCDAVIS MyInfoVault Logout

Edit my Account | Help | Contact Us

Home Enter Data CV Online NIH Biosketch Packet Online | Lisa Johnston

Home > Journal Citations > Resequence

Resequencing for Journal Citations Save

Journals (Published)

1949, JOHNSTON LM. Important points in the differential diagnosis of jaundice. J Tn State Med Assoc, 42(11): 381-4.

1951, JOHNSTON LW. Dentistry at mid-century. J Am Coll Dent, 18(2): 74-82.

1952, JOHNSTON LW, MOIR JC. A case of angular pregnancy complicated by gas-gangrene infection of the uterus. J Obstet Gynaecol

1952, JOHNSTON LM, CHANDLER JH. Use of cortisone in idiopathic acquired hemolytic icterus. Am Pract Dig Treat, 3(3): 195-6.

1952, JOHNSTON L. Cure of tobacco-smoking. Lancet, 2(10): 480-2.

1953, JOHNSTON LM. Fluid balance in medicine. J Tn State Med Assoc, 46(7): 239-42.

1954, JOHNSTON LB. Bizarre cases of intraabdominal injury. Am J Surg, 87(3): 390-5.

1955, JOHNSTON LC, BERSTEIN LM. Body composition and oxygen consumption of overweight, normal, and underweight women. J Lab Cl

1955, JOHNSTON LW. Chorio-epithelioma and malignant hydatid mole. Can Med Assoc J, 72(11): 824-7.

1956, BERNSTEIN LM, HICK FK, INOUE T, JOHNSTON LC, RYAN R. Body composition as related to heat regulation in women. J Appl Ph

1957, HICK FK, JOHNSTON LC, KOIK JV. Developments in eight patients with hypertension whose papilledema disappeared on treatme

1957, CLEMENTS SW, MCCOWAN JF, JOHNSTON LT, MCCAVITT ME. What is a rehabilitation counselor? J Rehabil, 23(3): 6-12.

1958, PORTER RM, JOHNSTON LM. Summer jobs: how to make them pay off. Hospitals, 32(7): 36-8.

1959, JOHNSTON LA, PAPPANIKOU AJ. A comparative survey of audiometric results among residential, rural and suburban school pop

1961, JOHNSTON LJ. Social service, a vital link in total care. Can Hosp, 38: 36-8.

1969, CRARNEL HE, JOHNSTON LW. The curing-hypertensive syndrome. Can Med Assoc J, 87: 1225

Done

Summary of Enhancements

The servlets to JSP conversion for all MIV data entry pages should be designed with the following features:

1. **System Scalability:** The new system should be able to accommodate the addition of new publication types and/or data fields.
2. **Application Robustness:** The new system should be so robust that it would not normally require intervention from the MIV application developers.
3. **Detection and reduction of Data Integrity Issues:** The new system should allow for the detection of data integrity issues and have a mechanism for the notification and resolution of these issues to reduce the possibility of data integrity issues.
4. **Improved System Performance:** The new system should process all data efficiently and as a result render improved performance for Packet and CV generation.
5. **Database Schema Robustness:** A secure and well structured database incorporating logging to protect sensitive data from accidental or fraudulent misuse.
6. **Privacy and Security:** Enforcement of stringent security permissions for authorization access levels to protect sensitive data.
7. **Provide foundation for faster more accurate future development:** By separating the look from the content you can assign different individuals to different tasks: Web page designers can build HTML, leaving places for the programmers to insert the dynamic content. The implementation of a global Cascading Style Sheet and User Interface design template will improve the ease of updates, ensure a consistent look and feel, and increase the speed of page rendering.
8. **Simplified Systems Administration:** The refactored data entry interfaces should be intuitive and easy for the Users to operate.
9. **Reduction of new employee downtime/improve User experience:** The new system will accelerate the time it takes to bring new employees to full productivity by simplifying and consolidating the data entry user interfaces.

Technical Specifications that will be added to this document

1. Database structure modifications.
2. Software modifications.
3. Security specifications.
4. Data entry field modifications.
5. System performance.