Project Contributors

ACT’s Enterprise Research
Information Systems Development Team
Robert Dias (Lead Dev.)
○ Siwei Kuang (Dev.)
○ Binod DC (Dev.)
○ Kevin Chou (Dir.)
○ Sandon Jurowski (Mgr.)

Office of Post Award Financial Services:
Mark Cooper (Dir.)
○ Marissa Yessis (Assoc. Dir.)
○ Sylvia Jeung (Project Manager)
○ OPAFS Accountants (QA Testing)

Health Sciences
(Development Support)

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Mark Cooper, OPAFS Director
**SPARC Overview:** The Office of Post Award Financial Services (OPAFS) Office is responsible for the central financial management of UCSD research awards. OPAFS was using a Paradox for DOS system to create invoices which was an unsupported technology that did not allow for the flexibility and needed functionality for the changing billing requirements of today's research awards. OPAFS partnered with ACT to build a new system, Sponsored Projects Accounts Receivable and Cash Management System (SPARC) that would replace the old billing system and build in efficiencies for the process by creating a platform system that could be the “one-stop” for all post-award financial activities and all campus non-student accounts receivable. SPARC has been a huge success for the OPAFS staff, and that success is due to the collaboration between OPAFS and ACT.

**The $300 Million Dollar Challenge**

UC San Diego is the 5th largest research university in the nation. Sponsored Research at UC San Diego accounts for approximately 1/3 of campus revenue: over $700 Million is committed annually through more than 4,000 active research projects. One third of that revenue (nearly $300M) is recovered through invoicing to collect payment. Producing accurate invoices and delivering them to sponsors in a timely manner is crucial to maintaining the financial operations of UC San Diego.

**Mounting Complexities:** Imagine the challenges involved with an administrative office preparing and delivering over 10,000 accurate and timely invoices to sponsors annually. These invoices are not standard and have unique requirements for each sponsor. This is the challenge that was facing UC San Diego's Office of Post Award Financial Services (OPAFS). As UC San Diego's volume of sponsored research grants increased, the decades-old Paradox accounts receivable system became insufficient to meet the growing needs of the campus. As the antiquated Paradox system became "officially unsupported" on modern operating systems, OPAFS knew it was time to find a new solution, or to create one of their own.

**Opportunities Ahead**

Beyond delivering accurate invoices in a timely and efficient manner, OPAFS saw several opportunities to improve workload management, encourage organizational communication and accountability, and promote best practices to reduce outstanding invoices (A/R Aging).

**An Inter-Campus Vision:** Currently UCSD handles 1700 incoming invoices each year from other UC campuses for outgoing annual sponsored research payments of $76 Million. For these inter-campus billing transactions (in which one campus is a primary recipient and the other campus is acting as a sub-recipient), OPAFS knew that there was a large opportunity to reduce administrative overhead and to improve communication between campuses. Rather than continuing to manage hundreds of incoming invoices each month from partner campuses, OPAFS had a vision to allow those campuses to manage their accounts online, using their own campus login, with visibility into activity and balances related to their portion of a project award.

**Reduce Accounts Receivable Aging to Increase STIP:** OPAFS realized that with a more advanced and efficient invoicing system, they could improve the timeliness of collection of sponsored research accounts receivable, and this would result in increased revenue to UCSD by increasing short-term
interest income (known as STIP). The legacy Paradox/DOS billing systems were not efficient enough to aid in rapid invoicing and collections. $11M of Accounts Receivable were over 90 days old (and $44M were considered "aging"). By reducing the aging collections, STIP would increase.

**Reduction of Redundant and Error-Prone Key Entry:** The Paradox system required OPAFS accountants to view data attributes in one system and manually re-enter it into the DOS application. Once a research project was awarded and the "fund" was created in the FundSetup application, OPAFS users were required to re-enter information related to the sponsor, the project and the fund into Paradox. On a monthly basis, mainframe billing transactions would need to be entered into Paradox so that an invoice could be generated and sent to the sponsor. This was a very tedious and time-consuming process, but it also opened the door to human error: if one mistake was made in key-entry, it could put the relationship between a sponsor and the university at risk. Clearly there was a need for automated integrations so that data would flow naturally into the invoicing system.

**Invoice Generation Overhead:** Accountants in OPAFS were spending nearly 1/2 of their time (an estimated 80 hours per month per person) assembling and delivering invoices. On a monthly basis, invoices totaling $21M were being produced. The process took weeks, and had to be repeated after each financial monthly ledger close. OPAFS knew that through integrations and automation, a system could be built in which the accountants' time could be re-directed away from administrative overhead and toward investing in daily operational needs at the core of their business.

**Security Concerns:** As industry-wide technical support and development of the Paradox system ceased, concerns were mounting about the system's security, access and audit controls. Additionally, roles were not granular enough to segregate one user's access to award information that was not relevant to them.

**Income Loss related to Billing Delays:** Timing is important when it comes to a bill being paid. The sooner an invoice can be delivered, the less chance there is for the invoice to go unpaid. An estimated $200k annually of unpaid invoices were attributed to delays in invoicing, either because a sponsor ran out of funds, disputed a late invoice, went out of business or simply decided not to pay. OPAFS knew that recovering these obligated funds by simply delivering invoices in an efficient and automated fashion would be a quick-win that would boost the ROI of the software development project.

**Planning For and Achieving Success**

**A Collaborative Solution:** As OPAFS began surveying what other campuses had implemented to address their own Sponsored Research Accounts Receivable issues, they surveyed several vended and open-source solutions.

They knew that much of their success would be tied to integrations with the campus financial system and with the research system "coeus". OPAFS reached out to the University of Maryland's OCGA office to learn what had worked well with their own coeus-integrated invoicing system called "BARS".

After exploring the feature-sets and development costs of implementing and customizing off-the-shelf invoicing software, OPAFS concluded that they had within their own organization the business and technical expertise to build exactly what was needed.
In 2011, OPAFS partnered with UC San Diego's ACT department to create what would soon be known as the Sponsored Projects Accounts Receivable and Cash management system, or SPARCM.

**Intra-Campus Investment:** Other campus divisions were also feeling an administrative burden related to sponsored research annual reporting needs: each sponsor who obligates funds to a sponsored research initiative has its own periodic reporting requirements. Some sponsors need financial reports on a quarterly or annual basis, and most require final expense reports for all research projects that have either been fully "spent" or which have reached their termination date.

This time-intensive ongoing reporting process prompted the Health Sciences division at UC San Diego to invest in the SPARCM project. By helping to fund SPARCM development resources to automate reporting (slated for release later in 2015), Health Sciences would soon greatly alleviate their administrative reporting burden, which had been a largely manual process involving collaboration between Health Sciences, OPAFS and project sponsors.

OPAFS and ACT met to formally approve the SPARCM project, and worked together to formulate Scope and Business Requirements documents, and developed the application in an iterative release scrum fashion. In 2013, the application was released and began generating invoices.

**A Collaborative Vision, Realized**

During the past year at UCSD, through collaboration with OPAFS and ACT, SPARCM has been used to invoice $278M in research-related activity. It has reduced the aging of accounts receivable, increased billing accuracy, fostered best practices and increased communication between business partners. Through invoice-creation automation, SPARCM has reduced the previously intensive and tedious monthly task of generating invoices after ledger close from 2 weeks to just a few hours.

**Outcomes:**

- Estimated 75% Reduction in staff hours devoted to data re-entry, researching information, creating manual bills (What took ~80 hours per person per month now takes ~20 hours/month)
- Increase in STIP income through reduction of $44M of "aging" accounts receivable
- Improved payment recordings; Timely collections of funds; Quick and Relevant Search Results
- Reduction in need for cost transfers due to communication of regulations and best-practices
- Inter-campus payments in production through federated UC Trust authentication
- Through SPARCM, UC San Diego now has the assurance that all expenses are billed and payments received. It is estimated that SPARCM is enabling the recovery of $200k annually of sponsor-obligated funds by delivering invoices in an efficient, accurate and automated fashion.
Client/Partner Satisfaction: The SPARCM project has strengthened the partnerships between campus departments and OPAFS accountants. It is estimated that accountants are now able to invest up to 10 additional hours with clients.

Accountants are now able to better track sponsor history and respond to sponsor inquiries more quickly. Accountants and departmental fund managers are now better-equipped to meet the specific, unique needs of each sponsor.

Inter-Campus Success: Eventually, SPARCM development progressed to include "inter-campus billing". This occurs when one campus (most often UC San Diego) is a primary award recipient and another campus is a "sub-recipient" or "sub-contractor" to perform a portion of the work involved in a project. As the sub-recipient delivers those services, those costs must be communicated and transferred, often through an invoice submission. In SPARCM’s early phases, OPAFS created invoices on behalf of other campuses by uploading to SPARCM (after receiving email docs from that campus contact).

In Spring 2015, SPARCM went a step further, by allowing other campus users to log into SPARCM using their own native local campus login. Through collaborative pilot testing with UCLA and UC Davis, SPARCM was soon registered as the first UC San Diego "UC Trust Federated Application". Inter-campus billing is now in production with UCLA and UC Davis, with the remaining 7 campuses to be integrated during the coming year.

Features Enabling Visibility, Efficiency and Communication: Through a robust mobile-friendly dashboard, SPARCM gives central and departmental users quick intuitive visualizations of how much money has been spent from an award, how much has been billed, and how much remains. SPARCM enables real-time communication between sponsors, departments and central billing offices, increasing the level of accountability and visibility, while greatly reducing administrative "follow-up" time needed to request payments.

Central Office users can manage sponsor contacts and fund contacts. They can easily generate accurate invoices, upload documentation, and submit invoices for routing and approval to the appropriate parties. Calendar-based invoices are auto-generated or custom-generated, depending on the type of award, and the invoices are emailed to sponsors requesting payment.

Invoice categories can be customized to meet the needs of the sponsor. Invoice templates are even customizable so that the end user is in full control of the look and feel of a bill.

Accountants are able to manage their daily workload through a SPARCM tool called "MyFunds", which is a feature-rich, excel-like interface for quickly filtering, searching and taking timely action on a fund or invoice at just the right time.

A rich user interface dashboard gives accountants a quick at-a-glance snapshot of the current status of a fund: how much has been paid out, how much has not yet been received, and a line graph showing spend activity over the life of an award. The SPARCM user dashboards provide a new level of visibility, transparency and accountability to the invoices and funds related to a sponsor, campus or department.

Architecting for Speed and Expansion with Next-Generation Technologies

SPARCM has been architected from the beginning with future growth in mind. It is built in a modular and flexible manner for portability: so that other organizations can eventually use the product to meet their own invoicing needs. SPARCM interfaces with UC San Diego's mainframe general ledger and operating ledger financial systems (ISIS and IFIS) to pull fund balances and fund charges. SPARCM pulls
sponsor and person information from the coeus research system, and also communicates with the FundSetup program to set up new projects within SPARCM. SPARCM has the ability to create unique FTP files for specific sponsors including the Veteran’s Administration system, OB10. SPARCM is built as an "Event-Based" application, enabling speed and simplicity. Technologies Leveraged include: Java/Spring/DB2 (portable to MySQL); HTML5 client-side database - local browser cache; Bootstrap, Angular, Jquery; Zena Batch Jobs (to pull payment, award and sponsor info); Jasper (for invoice templates); Velocity (for email template generation). SPARCM leverages the campus single-signon system and roles services so that users have access to only the information that they need to see.

The Road Ahead

SPARCM has proven incredibly useful to UC San Diego, and the functionality continues to grow. Currently in development is the automation of periodic and final reporting to sponsors: (Final Expense Reports, Federal Financial Reports and Private Grant Reports). Letter of Credit transaction management will be added as well as Cash Management, to automatically tie incoming payments to outgoing invoices. Additional planned future enhancements include: Collections management, Dunning letters and Correspondence tracking. The "plug and play architecture" that the SPARCM development team has implemented is allowing OPAFS and ACT to reach out to other areas of UC San Diego (such as Health Sciences), and potentially other UC campuses who may benefit from adopting SPARCM to manage their own AR needs.

Praise for SPARCM

"After working at a Harvard Medical School affiliate, MGH, and Johns Hopkins, I can say that this is the most advanced billing software I have seen to date. The dashboard feature is easy to use and ensures that all my monthly billing is on track."—Bill Gentz, OPAFS; "It is effective and efficient to have one system that provide the accountant with the award information and billing records at the same time."—Raquel McKelvey, OPAFS; "SPARCM has helped in the preparation of journals in the area of intercampus payments by adding tracking efficiency that was not previously attained. In addition, it has reduced paper files, provides continuity of previous forms used by leading agencies, is well received by agencies and is an easier training tool." —Teresa, OPAFS; "On Intercampus awards, the new automated journal process helps Accountants record payments from other campuses quickly and accurately. Reviewing intercampus payment journals has improved now that invoices from other campuses are uploaded to Sparcm."—Erica, OPAFS; "Invoices are now done in seconds rather than minutes and hours ... processed efficiently with less errors...."—Rhona, OPAFS; "... my invoicing time has literally gone from averaging 8-10 days to 2-3 days. SPARCM is the most efficient, user friendly, Accounts Receivable billing portal!" --Leyhda, OPAFS; "SPARCM is a sophisticated flexible billing system that streamlined our billing process ... it has brought tremendous efficiencies by allowing me to send invoices with a click of a button, giving me more time to focus on assisting our fund managers, on collections as well as close outs." --Wella, OPAFS;

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