

# STUDENT PROGRESS ASSESSMENT (SPA)

Nomination for the Larry L. Sautter Award for Innovation in Information Technology  
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**Project Overview:** SPA is a web-based mentoring and advising tool that graduate students complete with their faculty advisors to assess progress and align expectations.

## Project Highlights:

- SPA brings transparency to mentoring, a critical yet intangible aspect of graduate education that is especially important for doctoral students.
- The SPA questionnaire content was developed in collaboration among students (Graduate Student Association), administration (Graduate Studies), and Academic Senate (Graduate Council).
- Adoption has been rapid: reported completion rates of 90%+ across 75+ programs in its first two years, up from <10% for the paper-based form SPA replaced.
- SPA integrates with a suite of other applications that combine student information, role-based access, and messaging for a rich and seamless experience.
- New campus practices are evolving around SPA: interim assessments, program portfolio review of student accomplishments, and rewards for interdisciplinary mentoring.

## Project Narrative:

### *Origins*

UC Davis Graduate Council has a policy dating back to the 1970s requiring graduate students to document academic progress annually. The [paper-based Annual Progress Report \(APR\)](#) was required for each student every Spring Quarter. The form asked mentors to rank progress as either satisfactory, marginal, or unsatisfactory, and allowed mentors to provide comments in a box. The simple paper form did not prompt or facilitate discussion on specific and potentially sensitive topics such as outstanding degree requirements, research and publication plans, professional development goals, or financial support options. Completion of the paper APR was often a perfunctory exercise, and Graduate Studies typically only received paper-based APR forms if the progress was marginal or unsatisfactory. As a result, student university records were incomplete, and biased against satisfactory or exceptional progress.

### *Solution*

During the 2016-17 academic year, the Graduate Council, the Graduate Student Association, and Graduate Studies came together in an effort to improve the mentorship experience of graduate students. Together, this collaboration among faculty, students, and administration developed a Graduate Student Mentoring Action Plan. One action identified in the plan was to replace the paper-based APR with an [online Student Progress Assessment \(SPA\)](#) tool.

From there, the Graduate Studies Information Technology unit led the development and implementation of SPA, with ongoing consultation from students, faculty, and staff to decide on questionnaire content and application features. Graduate Studies launched a pilot deployment with a few volunteer programs in the 2017-2018 academic year, made refinements and a communication plan based on feedback, and deployed a full-scale web application in 2018-19.

The SPA tool promotes productive discussions and the setting of clear goals and expectations for graduate students. A SPA APR is still expected to be completed for each graduate student in

spring quarter, but mentors and mentees are instructed to complete the SPA tool during an in-person meeting as a joint exercise if possible. (The SPA APR can be completed asynchronously and remotely, for instance if a student is doing field research or a major professor is on sabbatical.) The SPA APR has approximately 20 different fields, prompting mentor and mentee with questions about frequency of meetings, coursework requirements, outstanding degree requirements, current and upcoming projects, and professional development goals. This discussion prompts discussions of achievements and concerns that otherwise might go unaddressed, to the detriment of student academic progress.

The SPA APR still concludes with an overall assessment by the major professor and graduate program advisor with options of satisfactory, marginal, or unsatisfactory. However, faculty must provide detailed expectations and timelines for students with marginal or unsatisfactory progress. Graduate program advisors then approve the progress report, and can send the report back for edits or additional comments. Students also get to acknowledge the assessment, provide comments, and reach out to Graduate Studies advisors. The SPA system routes all unsatisfactory progress reports to Graduate Studies Senior Academic Advisors (SAA) and the Associate Dean for Graduate Students and Postdoctoral Scholars (ADGSP), who then communicate expectations to the student. Students are given at least one quarter to meet the expectations outlined in the report. All reports are automatically saved in the graduate student's online file -- which not only replaced a cumbersome scan/upload process, but also is required by federal and university policy.

SPA contributes to broader initiatives in support of academic mentoring, with the potential for a transformative effect. A thorough evaluation of student progress proves critical in ensuring graduate students get support in multiple areas of the degree, feedback from their mentor, and early referrals to resources. We know graduate students need to take more than just coursework to be successful, so the online assessment requires questions and fields related to professional development (conferences attended, links to Individual Development Plans, seminars, etc.), and future projects. An in-person meeting makes the conversation about progress interactive and ensures a student receives guidance from their mentor. Lastly, the online tool has helped to identify conflicts between mentors and mentees. Graduate advisors and SAAs can identify situations where a mentor and mentee disagree or where expectations may be unfair and they can help remediate issues. Students may need referrals to campus resources such as to student counseling or the Student Disability Center. Improving the communication and ease in which staff and faculty can advise graduate students has resulted in a broader network of support for students.

### ***Adoption and User Satisfaction***

Campus adoption of SPA has been very successful, with 92% of students receiving a completed APR, excluding those excluded via the application because of graduation or attrition. Graduate Studies provides programs that complete an APR for a large proportion of students with additional fellowship support, as an incentive to use SPA.

### ***User Interface / User Experience***

SPA makes extensive use of its integration with other applications. Faculty and staff members can navigate easily among (1) SPA pages to initiate or update an assessment, (2) GradHub pages that consolidate student academic records, financial support, and administrative correspondence, and (3) PRM pages to verify or modify appropriate faculty reviewers and approvers. This is also important during review of SPA APRs by SAAs and the ADGSP within Graduate Studies, who can easily switch between each student's application, internal transcript, correspondence, and other documents as they formulate expectations based on the SPA APR.

The SPA application has clear navigation prompts for the workflow, including the program staff initiation phase, the mentor/mentee questionnaire phase, and routing for approval and student acknowledgement. SPA also sends automated emails to users in the workflow, with the possibility of setting notification frequency (e.g. to a weekly digest for graduate advisors who will approve APRs for many students in their program). Screenshots at [https://drive.google.com/file/d/1JzwQ7\\_M5J-F7ugb1uPCeSrAG4O6fqbj/](https://drive.google.com/file/d/1JzwQ7_M5J-F7ugb1uPCeSrAG4O6fqbj/)

Another useful feature of the SPA Test application allows permissioned staff members to temporarily impersonate other individuals. This is helpful for recreating and troubleshooting user experiences on campus. However permissions in SPA Test impersonations are limited by those of the actual user, to avoid disclosure of data that the impersonated user can access but the actual user cannot.

### ***Further Innovations and Technical Challenges***

An important aspect of SPA is determining who has the academic authority to complete an APR with a student. This should be a faculty member in the student's program, ideally the faculty member who works most closely with the student e.g. the thesis advisor or principal investigator in the lab where the student works. At UC Davis, a difficulty of verifying that a faculty member is a suitable mentor for a student is that a majority of graduate programs are organized as "graduate groups" rather than departments. Graduate groups are interdisciplinary graduate programs that attract faculty from different academic departments -- making graduate group affiliation difficult to identify from payroll records or other administrative systems. Also, Academic Senate policies on who can advise graduate students can require a combination of appointments (e.g. Specialist in Cooperative Extension along with Educator Without Salary, but not one without the other), and occasionally exceptions are granted.

To solve the business problem of determining affiliation with a graduate program and suitable academic credentials, SPA integrates extensively with the role-based access control application called People and Role Manager (PRM). PRM is another application designed specifically for UC Davis. PRM provides convenient and persistent delegation and audit of suitable titles. The interaction of SPA and PRM has had a side effect of more complete administrative data on graduate group faculty membership: because SPA gives programs a business reason to interact with PRM, and because PRM requires regular updating of graduate group faculty membership, the integration of the two applications provides better administrative data on faculty member than existed before. This is valuable for understanding faculty interdisciplinary research and teaching. It also serves as a basis for allocating Jastro-Shields funding, which recognizes graduate mentoring regardless of whether mentee enrollment and mentor appointment are in different departments, colleges, or professional schools. Previously, Jastro-Shields allocations were determined based on a time-consuming survey of program staff; now it is completed based on administrative data in SPA.

A feature that was added after initial deployment was the ability for a student's major professor or graduate advisor to initiate an interim or follow-up assessment at any time throughout the year. This has been important to document when students are not meeting expectations early in the year, and for professional programs that admit off-cycle from other academic programs.

A further interaction between PRM and SPA is the identification of Graduate Advisors. SPA uses PRM to route APRs to Graduate Advisors, who have been nominated and approved through a formal process, and have authority to recommend students for important academic

milestones such as advancing to candidacy and graduating. This path of approval validates that the faculty member completing the SPA APR is appropriate for that student and program.

### ***Technology Development***

When the project began, the working group set their purpose to have an open mind to change, to acknowledge there were factors out of their control such as a limited time frame and a set of unknowns, and to recognize that successful projects iterate and don't build everything up front. They identified their top goals for the project and discussed what would make up a minimum viable project. From that initiative, the team built out the SPA application using a Node.js & Angular framework in an AWS environment to satisfy the needs of a diverse campus.

### **Project Consumers:**

- 5000+ Students
- 1200+ Faculty
- 60+ Graduate Program staff
- 30+ Graduate Studies staff
- GradHub Application

### **Project Timeline:**

- Beta Testing: Beginning of May 2017
- Pilot Released: Last week of May 2017
- Final Released: Oct 2018

### **Project Team:**

- **Lead Programmer:** Eli Richmond
- **Programming Team Members:** Minh Nguyen, David Scott
- **Project Sponsor / Manager:** Jean-Pierre Delplanque
- **Student Participants:** Gwen Marie Chodur, Carlos Ruvalcaba
- **Staff Participants:** Holly Hatfield Rogai, Laura Young
- **Faculty Participants:** Carlee Arnett

**Project Technologies: [ see also links to: [SPA Schematic](#) , [SPA user documentation](#) ]**

Area*	Technology
Front End	<ul style="list-style-type: none"> <li>• Typescript</li> <li>• Angular v6 (Single Page App)</li> <li>• RxJS</li> <li>• Bootstrap</li> <li>• LESS</li> </ul>
Back End	<ul style="list-style-type: none"> <li>• Typescript</li> <li>• Node.js</li> <li>• async/await</li> <li>• Express.js</li> <li>• Knex.js</li> <li>• JSONB</li> <li>• Mocha.js</li> <li>• AWS KMS</li> </ul>
Back End Sessions	Stateless JWT
Database	AWS PostgreSQL
Server	Node.js running in Docker in AWS ECS behind AWS ALB

*\*Note: separate instances for development, continuous integration, test, and production*

**Dependencies**

Application	Function
AWS KMS	<ul style="list-style-type: none"> <li>• Encrypts/decrypts JWT for secure data transmission</li> </ul>
AWS S3	<ul style="list-style-type: none"> <li>• Stores database passwords in json</li> </ul>
Banner (Student Info System) API	<ul style="list-style-type: none"> <li>• Pulls the current term</li> <li>• Pulls a student's majors</li> <li>• Pulls a student's courses for the course questions</li> </ul>
Programs Manager	<ul style="list-style-type: none"> <li>• Pulls degree options by program</li> </ul>
People and Role Manager API	<ul style="list-style-type: none"> <li>• Pulls user details (name, email ...) and roles</li> <li>• Pulls permissions for access management</li> <li>• Pulls all student roles to sync changes</li> <li>• Pulls program coordinator, graduate advisor mentor, major professor mentor, student affairs officer roles and associate dean roles</li> <li>• Searches for students by name, email, and student ID</li> <li>• Creates or inactivates graduate advisor and major professor mentor roles</li> </ul>

**Dependents**

Application	Function
GradHub	<ul style="list-style-type: none"> <li>• Pulls list of student historical assessments for review</li> </ul>