From Meow to ROAR: Expanding Open Access Repository Services at the University of Houston Libraries

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INTRODUCTION The rapidly changing scholarly communication ecosystem is placing a growing premium on research data and scholarship that is openly available. It also places a growing pressure on universities and research organizations to expand their publishing infrastructures and related services. **DESCRIPTION OF PROGRAM** To embrace the change and meet local demands, University of Houston (UH) Libraries formed a cross-departmental open access implementation team in 2017 to expand our open access repository services to accommodate a broad range of research products beyond electronic theses and dissertations (ETDs). The result of this effort was the Cougar Research Open Access Repositories (Cougar ROAR), a rebranded and expanded portal to the UH Institutional Repository, and the UH Dataverse, which disseminates the full range of scholarly outputs generated at the University of Houston. This article describes the team's phased activities, including internal preparation, a campus pilot, rebranding, and a robust outreach program. It also details the team's specific tasks, such as building the Cougar ROAR portal, developing ROAR policies and guidelines, enhancing institutional repository functionality, conducting campus promotional activities, and piloting and scaling a campus-wide open access program. **NEXT STEPS** Based on the pilot project findings and the resulting recommendations, the team outlined key next steps for sustainability of the UH Libraries' open access services: continuation of the campus CV service, establishment of campus-wide OA policy, further promotion of Cougar ROAR and assessment of OA programs and services, and investment in long-term storage and preservation of scholarly output in Cougar ROAR.

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INTRODUCTION

Open Access (OA) has increasingly been embraced by the academic research library community over the past fifteen years as an alternative avenue for scholarly communication and research discovery. University of Houston Libraries, in collaboration with colleges and the Graduate School, initiated our institutional repository (IR) for theses and dissertations in 2009. In the years following the initiation of the institutional repository, all UH colleges and schools committed to submit their theses and dissertations electronically to the IR, which remained the extent of the Libraries' participation in open access scholarly communication. Subsequently, UH Libraries' five-year strategic plan (2017–2021) established a strategic goal of "expanding and promoting repository services enabling researchers to acquire and use collections for research endeavors as well as to store, preserve, and publish research output." This strategic drive toward greater open access has pushed UH Libraries to expand the scope of the university's open access services in order to provide safe, long-term storage and access for data and scholarship produced by the UH community, and to offer training and instruction around these new infrastructures and underlying competencies.

In order to operationalize this new strategic goal, UH Libraries established a strategic planning implementation team called the Cougar Scholar Open Access Team. The team worked with colleagues in the Libraries to rebrand, build, and launch a portal, the Cougar Research Open Access Repositories (Cougar ROAR), that provides convenient public access to the UH IR and the UH Dataverse, as well as supporting documentation such as submission policies, metadata guidelines, and training materials. Also, the repositories have been configured to accept submissions of articles, posters, educational materials, research data and projects, test instruments, and a wide variety of other scholarly products.

The rebranding of our institutional research and data repository services creates a sense of institutional pride and belonging. The revamping of the repositories created a one-stop resource for both research products and data output, which allows for improved access to our university scholarly output. Through marketing of this new portal and collaboration with campus units, UH Libraries assumes an active role in increasing the reach and impact of the research and scholarship produced at the University of Houston, and thus helps advance the Libraries' Strategic Plan.

LITERATURE REVIEW

The formation and steady rise of a global open access movement has been documented extensively in scholarly literature. The earliest and perhaps most widely adopted definition was developed by the Budapest Open Access Initiative (BOAI) (Chan et al., 2002). In

BOAI terms, *open access* refers to scholarly materials that are free to access online, immediately (i.e., without an embargo period), and without restrictions on their reuse, provided proper citation. With BOAI guidelines established, academic institutions and nonprofit organizations have widely implemented local online institutional repositories for the delivery of scholarly materials generated by their communities and beyond, providing a backbone for "green" open access, in which a scholar makes his or her own scholarly products openly available in the institution's IR while remaining within the bounds of copyright. As Tananbaum (2013) outlines, the early 2000s marked a quick rise in community-driven, "do-it-yourself IR solutions," with the DSpace, bepress, and ePrints platforms offering academic libraries open-source infrastructures for local repositories (p. 2). Harnad (2015) provides best practices for complementary institutional policies around open access that encourage researchers' compliance and, as a result, lead to increased use of local and discipline-based repositories.

In recent years, several large-scale studies (Piwowar et al., 2018; Wagner, 2010) have attempted to systematically track the worldwide growth of open access repositories and content. A study undertaken by Pinfield et al. (2014) points to uneven global trends in local repository implementation and usage, resulting in—and exacerbating—disparities in the representation of scholarship from developing geopolitical areas and "peripheral" countries and languages (pp. 2408–2412). Issues of equity and accessibility remain at the forefront of challenges faced by open access advocates at the international level (pp. 2415-2418). Despite widespread adoption of repositories, IR managers and advocates at the local level are met with cultural and generational resistance in their efforts to expand the range and quantity of content in their repositories. Dubinsky (2014) provides a thorough history and survey summary of the barriers to faculty participation in self-archiving practices as well as other methods of harvesting scholarly works, concluding that the adoption of IRs and creation of dedicated staffing positions for their promotion "[do] not yet pose a challenge to traditional models of scholarly publication" (pp. 1, 17–18).

The Open Science Initiative Working Group (2015) further emphasizes the increasing pressures felt by academic libraries, scholarly institutions, and research communities around the world to adapt large-scale OA implementation, noting that local pressure points vary and that a wide range of marketing and collaboration strategies are currently being explored in order to ease specific pressure points and build capacity for the cultural change required for OA to succeed at scale (pp. 30–32, 35–43). Several use cases have been published (Brand, 2012; Jantz & Wilson, 2008) that point to strategies proven to help drive faculty deposit and IR success at the local level. Ferreira, Rodrigues, Baptista, and Saraiva (2008), for instance, provide an extensive use case that emphasizes the need for (1) a comprehensive promotional plan that aims to communicate not directly at the target

audience but "flood[s] the surrounding channels that nourish their informational needs"; (2) a range of "value-added services," such as help pages, documentation, and user guides that demystify key aspects of IR participation; (3) functional "add-ons" that deepen user engagement, including statistics modules, "request a copy" buttons, interactive functionalities (built-in commenting and recommending tools), and predefined taxonomies for easy description of a submitted work; and (4) self-archiving mandate policies combined with financial incentives for compliance (pp. 4–7). Giesecke (2011) also pointed to particular functional needs that drive success, including an interactive statistics module, but, taking heed of the prevalent low researcher participation data, she arrived at "a great marketing slogan. . . . Step one: send us your vita. Step two: there is no step two" (p. 537). Giesecke found success in a mediated deposit approach, allowing auto-generated download reports to encourage word-of-mouth participation in the library-mediated CV service.

The literature addressing the motivations for, process of, and benefits and challenges of rebranding an institutional repository is scant. Many studies have been published over the past fifteen years that detail a variety of IR marketing strategies, some of which discuss cosmetic or functional improvements to particular elements of an IR's interface. For instance, Palmer, Teffeau, and Newton (2008) recommend "usability testing of the repository's Web interface" and applying those results toward the development of "high-functioning 'front ends'" of IRs (p. 152). These interfaces would integrate tools that identify eligible content and run immediate copyright clearance for works, thereby lowering common barriers for self-archiving and streamlining the researcher's experience depositing to the IR (p. 157). Likewise, Betz and Hall (2015) ran extensive UX testing on their institutional repository in order to refine and focus on "ease of use" during the self-archiving process, identifying many roadblocks in the process (pp. 51–53). Ultimately, they were able to lower many of these barriers to submission through improvements to their IR interface, though they were often limited by the capabilities of the repository software, and concluded that a user-friendly UX will only go so far in encouraging community participation; rather, "sustainability relies on marketing, direct outreach . . . and significant staff involvement in identifying content for inclusion, investigating rights, and depositing on authors' behalf" (p. 56). Other studies have applied a market-oriented approach to changing researcher behavior and increasing rates of IR deposit. Ramírez and Miller (2011), for example, recommend IR advocacy through a range of "people based activities," including customized OA plans for researchers that directly appeal to personal needs (p. 13). Gierveld (2006) draws from best practices in the field of communications to envision the IR as a "product" that has the accompanying "communication strategy necessary for the product . . . to change [client] behaviour." Yang and Li (2015) make a glancing reference to rebranding of their university's IR, but do not explore the ramifications of this change on their OA program (p. 3). The literature lacks research on how an IR's aesthetic design and branding impact the ultimate success of an

academic institution's OA program.

A range of studies have offered novel ways in which academic libraries have partnered with faculty, student communities, and campus units in efforts to boost IR usage, build new OA services, and create opportunities for introducing core competencies around scholarly communication to a younger generation of researchers. As faculty attitudes toward open access and IRs have been slow to shift toward acceptance, many librarians have developed strategies focusing on student engagement (Hahn & Wyatt, 2014; Watson, 2007; Yang & Li, 2015). An early study by Nolan and Costanza (2006) details success stories by several liberal arts college libraries that expanded on thesis deposit to include additional student works, leading to librarians gaining opportunities to directly interact with students in the classroom on "issues surrounding copyright, fair use, licensing, and alternative publishing models" (p. 92). A more recent study by Rozum and Thoms (2016) explores both student and faculty benefits of capturing undergraduate student scholarship in an IR, in particular posters and data sets that are often discarded after they have been presented or used to reach initial findings, but that offer enduring value to external communities when made available OA (pp. 316–17).

The case study at UH described in this article adds to the existing literature around IR adoption at large public research institutions and contributes potential models of success in areas such as repository marketing/rebranding and forging new partnerships with administrative and academic units.

DESCRIPTION OF PROGRAM

The Cougar Scholar OA Team started the project with group planning. The team brainstormed detailed project activities and divided them into three phases. Phase One included internal preparation activities, such as conducting an environmental scan; developing the Cougar ROAR web portal; performing UH open access repositories' functional enhancement; and building out Cougar ROAR policies, metadata guidelines, training, and marketing materials. Phase Two involved piloting with campus units. The team identified individuals for content deposit and solicited campus units and administrative offices for collaboration. Phase Three included data analysis, project reporting, and communication. Subteams were formed to carry out specific tasks for each phase.

Internal Preparation

In order to inform the work of the team, it was critical that the Cougar Scholar OA Team collect data on open access benefits and challenges, our faculty and researchers' expecta-

tions, and other institutions' lessons learned and success stories. An initial environmental scan was conducted through a literature review, faculty focus group sessions, and benchmarking with peer institutions. The project team also reviewed literature to collect use cases, benefits, challenges, perceptions, and success stories of open access initiatives. The output of this activity is available as a Data Summary Sheet in Appendix A.

The focus group subteam held two information gathering sessions with UH faculty in April 2017. The goals of the sessions were to document current faculty perceptions of open access repositories, understand their digital sharing and access needs, and identify potential participants for the Cougar Scholar OA Team pilot project. The focus group team collaborated with the Libraries' Liaison Services department to recruit a total of seven participants from a variety of academic fields. During the sessions, the focus group team provided participants with a high-level overview of the UH IR and the UH Dataverse, described the functionality and interfaces of the repositories, and explained the benefits of making one's research available open access. The team also asked participants to share their thoughts on the potential barriers and advantages to using the repositories. Faculty who participated in the sessions described UH open access repositories as a portal that would help promote UH research and publications while elevating UH as a brand as well as the university's overall prestige and scholarly reputation, even though they shared challenges such as lack of time, copyright clearance, and perceived competition from other publishing platforms such as ResearchGate and Academia.edu.

The website subteam collaborated with Library Technology Services to develop a one-stop portal to connect users with the UH IR and the UH Dataverse. The Cougar Scholar OA Team named the portal Cougar ROAR.[1] The primary purpose of this portal website is to assist users with submitting and discovering works in the UH IR or data in the UH Dataverse. Large search boxes for each repository appear prominently on the portal page. Furthermore, in order to promote user submissions to the repositories, direct links to the repositories' respective submission forms are available below each search box along with links to step-by-step "How to Submit" guides for the repositories. Also included on the portal page are links to the respective homepage for each repository, and a link to a revised "Open Access at UH" web page, containing important information and resources about the Libraries' current open access services. Additionally, the portal provides a concise introduction to Cougar ROAR and contact information for members of the UH scholarly community who require further assistance.

UH Libraries' instances of the open access repositories DSpace and Dataverse are hosted by

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[1] For more on Cougar ROAR, see http://libraries.uh.edu/roar/.

the Texas Digital Library (TDL). The technology improvement subteam collaborated with TDL to streamline the DSpace user submission form for the UH IR. The team incorporated feedback from focus groups to identify the most pertinent fields for inclusion on the form, and made determinations regarding which fields should be mediated by library staff. These changes were implemented in configuration files on the UH IR server, and the new submission process was tested and refined by several stakeholders. Permissions settings were adjusted to allow UH faculty, students, and staff to easily submit their works to a single, appropriate collection in the UH IR without confusion. The team also created a "Start a submission" button that now appears prominently on the UH IR homepage, directing users straight into the submission process. Finally, the team researched possible usage analytics options for integration into the UH IR and consulted with colleagues at several other TDL and DSpace institutions to gain a sense of the range of possibilities in this area moving forward.

The documentation subteam consulted the documentation created by several peer and aspirational institutions and created documentation about the UH IR and the UH Dataverse. For each repository, the team identified three main areas where information needed to be provided in order to maximize the value of the repositories to users: policies, repository use, and data description guidance. The team developed "About" documentation, including a high-level overview of each repository and the types of content accepted.[2] The team also created a "Quick Start Guide," which provides simple, step-by-step instructions for users depositing their work to either repository.[3]

The policies subteam drafted policies for the UH IR and the UH Dataverse and submitted these documents for formal approval by the Libraries' Digital Collections Management Committee (DCMC). The subteam, drawing upon policies from peer and aspirational institutions, as well as on existing policies and documentation from TDL, crafted policy documentation for each repository that addresses scope of eligible content, submission size limits and criteria, metadata supported, current level of digital preservation support, licensing options and restrictions, information security, withdrawal and takedown of content, and matters of copyright. After formal approval from the DCMC and Libraries Administration, these policies were made publicly available on the Cougar ROAR portal website.[4]

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[2] For UH IR documentation, see http://guides.lib.uh.edu/c.php?g=722515&p=5151192; for UH Dataverse documentation, see http://guides.lib.uh.edu/c.php?g=722515&p=5151207.

[3] For UH IR Quick Start Guide, see http://guides.lib.uh.edu/c.php?g=722515&p=5151360; for UH Dataverse Quick Start Guide, see http://guides.lib.uh.edu/c.php?g=722515&p=5151350.

[4] For UH IR Policies, see http://guides.lib.uh.edu/c.php?g=722515&p=5151363; for UH Dataverse Policies, see http://guides.lib.uh.edu/c.php?g=722515&p=5151330.

The metadata subteam analyzed the metadata fields for both the UH IR and the UH Dataverse, made recommendations to the larger Cougar Scholar OA Team group, and created documentation for field use in both repositories.[5] Based on feedback from an earlier UH IR pilot project (Washington, Townes, Weidner, Thompson, & Wu, 2017) and insights from the Libraries' Digital Scholarship Coordinator, the number of metadata fields in the UH IR visible to submitters was reduced from 13 to 9, with required fields reduced from 8 to 6. These changes considerably simplified the submission process for the user. Within the current version of DSpace, the submission process has been streamlined as much as possible. Certain metadata fields, such as "Publisher" and "Citation," are available only to librarian reviewers in the Metadata Unit so that accurate values may be added to these fields if the information is available. The subteam also clarified and simplified the UH Dataverse metadata guidelines.[6] To maintain interoperability with TDL's Texas Data Repository, the team did not modify the metadata profile for the UH Dataverse, but focused on creating documentation that clarifies potentially confusing elements.

The training subteam was tasked with creating instructional materials that could be used by librarians to train individuals or groups of users on the submission process for the UH IR and the UH Dataverse. The team drew from instructional guides provided by TDL, existing presentations that team members had developed in the past, and openly available slide decks shared by repository services librarians at other institutions, compiling and curating two main sets of presentation slides: one for instruction around the UH IR, the other for instruction on the UH Dataverse. A third presentation was developed that provides an overview and brief history of the open access movement, describes the benefits of making one's work openly available, and addresses frequently cited concerns by researchers engaging in open scholarship. Each of these presentations was designed to be easily adapted to suit the needs of different audiences; they can also be used in combination with one another. In addition, an informational handout was created, adapted as needed, and distributed at live sessions with faculty during the pilot phase of the project. The instructional presentations have been made publicly available for users' reference on the Cougar ROAR portal website.[7]

One of the project's major contributions was the rebranding of existing repository interfaces, program documentation, and marketing materials. The promotion/marketing subteam worked with UH Libraries' Office of Communications and Library Technology Services

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[5] For UH IR Metadata Guidelines, see http://guides.lib.uh.edu/ld.php?content_id=37578371.

[6] For UH Dataverse Metadata Guidelines, see: http://guides.lib.uh.edu/ld.php?content_id=35666240).

[7] For the Cougar ROAR Research Guide, see https://guides.lib.uh.edu/roar.

to create the brand name "Research Open Access Repositories" or ROAR, and a logo that would help distinguish ROAR-related platforms and documentation from other UH Libraries and university initiatives. Incorporating university colors and the UH Cougar mascot, the branding tapped into a sense of campus pride and also leveraged UH-sanctioned color schemes to make the website attractive, familiar to its primary audience group (UH students, faculty, and staff), and trusted as a UH-affiliated webpage. The rebranding effort also became a core component of the Cougar Scholar OA Team's marketing effort. The project team found that the rebranding effort helped to create positive energy around ROAR services and its web interface, which inspired multiple stakeholders in the Libraries to embrace Cougar ROAR and actively and openly advertise it on campus.

The promotion/marketing subteam was also responsible for the development of marketing materials that would describe the benefits of depositing materials into the two open repositories. The subteam helped create marketing materials such as an informational postcard. The postcard, utilizing the Cougar ROAR logo and UH brand colors, announced the launch of the Cougar ROAR portal. It also highlighted the results of large-scale citation studies showing the increased impact of research that was made available through open repositories. The postcard was distributed to faculty mailboxes and other gathering spaces across campus.

Campus Pilot and Outreach

During October and November 2017, the Cougar ROAR pilot subteam designed a pilot program that tested and refined documentation and workflows for both repositories. The team recruited participants by collaborating with Liaison and Branch Services, which helped identify individuals and departments who were likely to be interested, as well as by following up with focus group participants who had previously expressed interest in the Cougar ROAR initiative. The depositing of materials into the repositories during this pilot phase occurred in three primary ways: (1) pilot participants were asked to self-deposit their scholarly works to the repositories; (2) pilot participants were given the option of submitting their CV to the team and having the Libraries' staff process their publications for copyright compliance, then deposit eligible content into the repositories on the researcher's behalf (mediated deposit); and (3) the team expanded partnerships with the Graduate School and Honors College in order to batch ingest works of student scholarship.

Individual researchers and academic departments self-selected for the pilot phase. The range of participants allowed the team to learn about and adjust for disciplinary needs and practices around open sharing, as well as identify open access advocates across campus

who might be called upon to assist in promotional efforts within their department, center, or lab. After recruitment, four faculty members responded to the team's email prompts to self-deposit their research products. Participants were asked to log into the UH IR, supply the required metadata for scholarly items, and upload the digital file(s). The team provided a feedback survey for participants to complete upon uploading content. The survey solicited opinions on the ingest process and potential future services and Cougar ROAR features. Only one faculty member participated in the self-deposit pilot and provided feedback via the survey.

The team collected CVs from five faculty members who expressed interest in the mediated deposit pilot program. An additional three faculty members also participated through word of mouth from the initial five, bringing the total faculty member participants to eight. The Digital Scholarship Coordinator and Metadata Coordinator worked with Metadata Unit staff members to develop workflows for the mediated deposit of scholarly works listed on faculty CVs, with the expectation that this could become a marketed library service in the near future.[8] The mediated deposit pilot allowed staff to develop, test, and document workflows for processing not only publication data from CVs but also more automated workflows using UH faculty research data exported from major databases, such as Scopus and Web of Science; formatted into repository-compliant articles and metadata; and batch ingested into the UH IR.[9] These efforts allowed the team to deposit nearly 600 additional UH scholarly products processed during the two-month pilot phase of the project.

The UH Honors College and Graduate School hosted events for students to showcase their research. The Cougar Scholar OA Team reached out to the Honors College and developed workflows that allowed for the deposit of nearly 100 student research projects into the UH IR, including papers and posters accepted for the annual Undergraduate Research Day and the papers produced by the Summer Undergraduate Research Fellows. The team partnered with Graduate School administration to establish a workflow for the annual processing and deposit of roughly 200 accepted graduate research and scholarship projects into the UH IR. These administrative pilot participants were selected largely based on strong existing relationships between UH Libraries staff and those charged with organizing the student scholarship showcase events. The organizers expanded existing workflows to collect metadata for each work for eventual deposit in the UH IR. Both the Graduate School and Honors College understood and were able to communicate to their faculty

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[8] Staff investigated CV service workflows developed by University of Pennsylvania Libraries as well as models developed by Harvard Library, Marquette University Libraries, Utah State University Libraries, and University of Nebraska-Lincoln Libraries.

[9] For CV Service workflow documentation, see http://bit.ly/UHoustonCVWorkflows

and students the benefits of making student works openly accessible, which allowed the team to develop simple permissions language that was communicated to the authors. Of the over 400 authors involved in this portion of the pilot, only a handful opted out of the deposit service.

The team initiated conversations with several other academic units on campus to establish similar routine partnerships moving forward. With help from Liaison Services librarians, the team provided information/training sessions in departmental meetings of the following departments/groups: Engineering, Psychology, the Graduate College of Social Work, the Evolution and Ecology group in Biology, and the College of Education. The Cougar Scholar OA Team believed it was vitally important to communicate the Cougar ROAR initiative to the UH campus community in order to grow campus awareness and support. The team invited the Dean of Libraries to introduce this new endeavor to the Provost's Office, the Division of Research, the Dean's Council, and the Faculty Senate Library Advisory Group. The team also asked the Libraries' Associate Dean for Academic and Research Services to discuss the Cougar ROAR initiative with the Associate Deans of Research group.

NEXT STEPS

The team gained valuable insight while developing the Cougar ROAR portal and launching the campus-wide pilot program. Our observations and findings revealed that, if the ROAR portal is going to serve as the backbone of a set of new open access services and initiatives over the coming years, it will be critical to continue developing a multifaceted approach to promoting the portal and attracting a rich variety of content. Based on the findings, the Cougar Scholar OA Team generated four recommendations that the Libraries is currently fulfilling.

First, based on the recommendations put forth by the Cougar Scholar OA Team, UH Libraries formed and launched the Open Access Working Group. The goal of the group is to ensure the sustainability of current and future open access initiatives at UH, including the implementation of the recommendations from the UH Libraries' "Report on Open Access Publishing for the Research and Scholarship Committee of the Faculty Senate with Recommendations."[10] As such, the Open Access Working Group will coordinate and oversee the work of Cougar ROAR, including the navigation of technical and promotional elements required to expand the functionality and visibility of the portal. The

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[10] For the "Report on Open Access Publishing for the Research and Scholarship Committee of the Faculty Senate with Recommendations," see: https://uh-ir.tdl.org/uh-ir/handle/10657/1962.

Libraries' Digital Scholarship Coordinator will act as lead, and the team will incorporate individuals with direct job responsibilities or existing expertise. Membership includes the Metadata Coordinator (to assist with metadata needs and workflows) and the Open Educational Resources Coordinator (to integrate OER content into the IR and participate in discussions around hosting research materials locally). In addition to regularly serving members, the working group can also draw upon other expertise within the Libraries as needed, including those knowledgeable with expanding contractual language that favors the deposit of content into Cougar ROAR, integrating publishing portals for digital scholarship projects, and connecting more comprehensively with key University stakeholders, such as the Graduate School.

Second, in order to accelerate content growth, UH Libraries is implementing a submission strategy combining self-submission with a scaled-up mediated submission program. Both existing literature and the team's pilot program emphasized the low rate of faculty self-submission. Rinehart and Cunningham (2017) deployed a survey for institutional repository administrators listed in OpenDOAR in the United States. The results of this survey showed that "nearly two-thirds, or 22 of the responses indicated that less than 25% of the material in the IR was self-submitted. Another 6 reported no material that was self-submitted. Only four have self-submissions as more than 50% of their materials. Therefore, most IRs use mediated submission processes for much of their material" (p. 42). Developing a hybrid submission strategy would provide the Libraries with both maximum flexibility and the opportunity to proactively solicit content.

The third recommendation from the Cougar Scholar OA Team was to launch a Libraries-operated CV service. The workflow allows a faculty member to submit their CV or list of publications to the Libraries; then, Libraries staff members review the list of publications, determine copyright/permissions for works, contact publishers for permission on the faculty member's behalf if needed, and post permitted materials to Cougar ROAR. In order to establish and sustain the recommended CV service, the UH Libraries hired and trained student workers to assume responsibility for the processing of materials into the UH IR. To date, 43 faculty members from 17 academic departments have participated in this service, resulting in the preparation of 2,365 scholarly works for the UH IR, 56% of which have so far been deposited over the course of the first nine months of operations. This service team has found that 89% of journal articles processed allow for some version to be posted in the UH IR. The faculty response rate for requests for specific versions of articles has been encouraging, allowing the team to reach that 56% mark, which is rising as more preprints and postprints arrive from researchers. The team has since developed workflows allowing for copyright clearance of book chapters and conference proceedings, as well as broadening the scope of its mediated ingest service to include other types of scholarship,

such as recordings of presentations and keynote addresses.

The fourth recommendation focused on expanding the Cougar ROAR promotion and out-reach endeavors. A long-term strategy for Cougar ROAR promotion efforts (among different Libraries departments and campus units) includes (1) raising awareness of its benefits and related services and (2) advancing any future UH Libraries' campus-wide open access programs. The successful outreach and partnership with campus units established during the pilot suggests that careful and intentional planning yields interest from researchers to participate. Building off of successful pilot efforts with the Graduate School and Honors College, the Cougar ROAR Working Group has identified 30 regularly scheduled scholarly events that it believes to be prime candidates for representation in the UH IR. These events include lecture series, student poster sessions, annual forums, symposia, seminars, and colloquia. The team is working with the organizers of these events to introduce and customize workflows that will allow recordings, slideshows, and other materials generated for or through these events to be deposited. The group has also initiated a pilot offering that will see the ingest of Senior Honors Theses into UH IR.

Sustainability Plan

Based on the pilot project findings and the resulting recommendations, the Cougar Scholar OA Team outlined key next steps for short-term and long-term sustainability of the UH Libraries' open access services. The team organized these activities by those stakeholders who play a role or have a specific responsibility in open access workflows and outreach. Key stakeholder groups for the work taking place within the Libraries include: the Libraries' Digital Research Services (DRS) department, Libraries Administration, and other Libraries departments and partners, such as Branch Library Services (BS), Liaison Services (LS), Library Technology Services (LTS), Metadata and Digitization Services (MDS), and Research Materials Procurement (RMP). The Cougar Scholar OA Team also divided the activities by "Short Term" tasks (up to 6 months to complete), "Short Term-Ongoing" tasks (up to 6 months to start and then continuing on at regular intervals), "Medium Term" tasks (6–18 months to complete once started), and "Long Term" tasks (a formal timeline yet to be established due to outside factors and priorities that evolve over time). A complete breakdown of this work is included in Table 1.

CONCLUSION

Through careful planning, the rebranding of interfaces and marketing materials, and executing a campus pilot project, the Cougar Scholar Open Access Team has established the key building blocks for a successful OA repository infrastructure, including core repository policies, thorough workflows, and engaging outreach materials. Equally important,

	DRS	Libraries Administration	Libraries Departments	Campus Units
Short Term (up to 6 months to complete)	Implement a CV service, starting with a pilot program targeted to a specific audience	Approve the hiring of student workers to build a CV service, starting with a pilot program	Identifying future roles/responsibilities for outreach (BS, DRS, LS) Develop a dedicated web presence for UH Libraries digital collections (DRS, LTS, MDS) Create marketing materials (BS, Communications, DRS, LS)	Develop policy that authorizes Libraries to ingest faculty content (Faculty Senate OA Policy Task Force)
Short Term–Ongoing (6 months to start and then ongoing)			Continue to work with TDL to improve repository functionalities (DRS, MDS, TDL) Continue to work with campus partners to ingest quality research content Continue to monitor, assess, and improve mediated process (DRS, MDS) Develop a plan for enhancing local storage capability (DRS, LTS)	
Medium Term (6–18 months to complete)		Enter into additional OA memberships that give faculty incentives/ discounts for publishing Budget for additional funding for metrics/ statistics modules	Insert author rights language into UH Libraries e-resources license agreements with vendors (DRS, RMP) Assess impact and reach of scholarly works (CRWG)	Launch campus- wide open access marketing and promotion campaign (BS, DRS, Communications, LS, other campus units)
Long Term (future possibilities)		Invest in additional TDL storage	Incorporate ROAR into digital preservation policy if needed (DPWG) Develop program for ingesting university publications (SC, DRS)	

Table 1. Timeline for Next Steps by Stakeholder Group

the team has also cultivated new relationships with interested faculty and departments—an activity that will help promote and expand Cougar ROAR's purpose and usefulness. Building on this momentum, the future work of the Open Access Working Group will continue to expand OA repository functionality and the suite of services around Cougar ROAR. All of this work is crucial as UH strives to increase its research productivity. In the summer of 2018, UH's president announced a new campus research initiative designed to boost campus research productivity over the next five years. The success of this program, in part, will rely on the university's ability to broaden access to and assessment of its research output. UH Libraries, with a more defined set of OA repository services and an exciting new marketing campaign around Cougar ROAR, is better positioned to support this ambitious research initiative through more comprehensive OA services. Through close collaboration with campus partners, the work of the Cougar Scholar OA Team has propelled UH Libraries into this leadership position. UH Libraries' open access services will play a valuable role in expanding UH's research enterprise.

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APPENDIX A
Cougar Scholar Open Access Team Environmental Scan Data Summary

Cougar Scholar Open Access Team conducted an environmental scan through a variety of activities. Below is the summarized benefits, challenges and success strategies for Institutional Repository and Data Repository from the environmental scan. The team took advantage of the collected data in our Cougar Research Open Access Repositories (ROAR) portal design, content submission process revision, guidelines/policy development and marketing.

Institutional Repository (IR)

Benefits:

- Serves as a portal for scholarship which helps promote faculty research/publications to much broader audience (beyond academia), amplify research, promote institution's brand, the university's prestige and scholarly reputation
- Improves scholarly communication via IR for allowing constituents gain access to institution's research content
- Collects university research/publications in one-stop place, which benefits interdisciplinary collaborations such as build research hypothesis with faculty/researchers from other departments, inter-pollinate or cross-pollinate between disciplines
- Increases efficiency through centralized distribution
- Helps students to identify professors' research areas for independent studies and for opportunities to collaborate
- If syllabus are allowed in IR, students can review syllabus for both past and current semesters
- Informs decision to accept an offer of employment from an institute of higher education
- Incorporates IR resources to courses
- Guarantees long-term preservation
- Broadens accessibility that government agencies and funding sources often seek or demand
- Cross-searches internal/external repository collections
- Helps dissertation authors identify potential members for dissertation committee
- Serve as part of the ongoing literature survey

Challenges:

- Articles have already been published in other resources
- Researchers usually don't have good understanding of publishing rights
- System functionalities are not compatible with certain kinds of scholarly output (such as art, music, dance, theater etc.)
- Too much effort and time to load works into the Institutional Repository
- Permissions/copyright clearance hindrance
- Competition with other scholarly information networks such as ResearchGate, Academia, Google Scholar, Dropbox, Google Drive etc.
- Lack of incentives from institutions
- Lack of participation and lack of content in the IR
- Lack of IR visibility
- Technical difficulties related to content submission and retrieval

Data/Dataset Repository

Benefits:

- Helps archive data/dataset and allow researcher to systematically access data
- Shares data with trusted network/project members
- complies with grant funding agency requirements
- Be able to reanalyze and repurpose data
- Valuable for certain discipline such as social science and natural science
- Use data and dataset for teaching purpose (as teaching resources/tools)
- A means of gaining access to raw data and supplementary underlying research project not available through any other channel
- Gains value of data, such as videotapes, transcripts, for pedagogical purposes

Challenges:

- Security of data and data privacy
- Access control and administration of data
- Approaches to data audit and back-up

- Lack of ownership of raw data
- Plagiarization of data

Success Strategies for Open Access (OA) Repositories

- Ease of use for researchers including automated process such as automatically include and discover recently published work in Google Scholar and other platforms
- Simplify submission process
- Display metrics for downloads/citations and other assessment measurements
- Articulate the benefits of OA repositories such as impact of submission to IR and Data repositories on tenure and promotion process
- Develop a promotion plan and actively promote the availability of institutional repositories
- Offers better system features for discovery, statistics, access control, controlled vocabulary, commenting, recommendation, web of communication etc.
- Take advantage of existing resources such as institution's directories, ResearchGate, Academia.edu, Google Profile for CVs and bibliographical content of faculty/researchers
- Conduct training and education sessions about OA repositories
- Have appealing institutional branding and name for OA repositories
- Disseminate an effective marketing slogan
- Build value-added services, guidelines on OA platform
- Develop institution's OA policy combined with the financial incentives

End-users Expectations:

- Be able to keep track of different versions of the same document
- Be able to load content from different computers and locations, both Mac and PC
- Be able to organize their materials according to their own scheme
- Be able to control ownership, security, and access
- Ensure that documents are persistently viewable or usable
- Have someone else take responsibility for servers and digital tools
- Keep everything related to systems easy and flawless
- Reduce system chaos