CONNECTING OHIO UNIVERSITIES

WITH INDUSTRY TO DRIVE INNOVATION

Developed and written by
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![Digital Science logo]
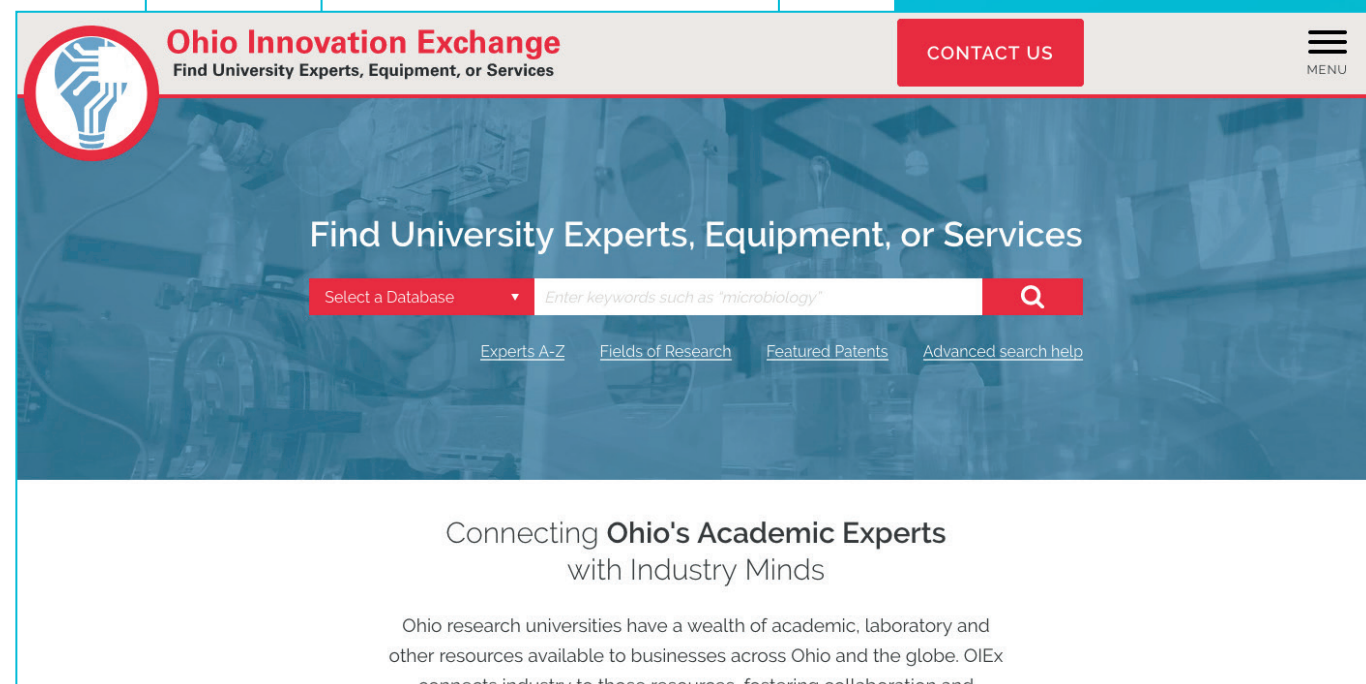
> The home page of the OIEx portal provides visitors with a simple search across the assets of 14k experts, equipment, services and IP from the 6 participating Ohio universities

The Ohio Department of Higher Education together with six participating universities has launched the Ohio Innovation Exchange to help increase collaboration between higher education and industry. Built upon technology from Digital Science portfolio companies Symplectic and *Dimensions*, the new platform seeks to offer a new information-driven solution to facilitate connections and collaborations. We interviewed OIEx project leaders Tim Cain and Jeff Smith to understand how the project came about and what its benefits are.

In October 2018, the Ohio Department of Higher Education and six universities from across the State of Ohio launched the Ohio Innovation Exchange. This web-based portal provides a next-generation mechanism to stimulate increased collaboration between Ohio's universities and industries. Underpinned by high-quality curated data, OIEx is supported by an inter-university network of industry and research professionals.

We interviewed two of the project leaders Tim Cain and Jeff Smith on the strategic rationale behind the Ohio Innovation Exchange, their goals for the project and why Digital Science was selected to deliver the solution.

Dr. Tim Cain is Associate Professor of Biomedical Sciences at Ohio University, Dublin and served as an executive on-loan to the Ohio Department of Higher Education (ODHE) lending experience and insights to the statewide initiative. In a previous role at the Ohio State University, Tim had spearheaded the design and build of an information system to support a workflow for faculty tenure.

This earlier effort and experience laid the groundwork for the later implementation of *Symplectic Elements* by Ohio State, and positioned Tim as an ideal candidate to complete a project feasibility study and to develop a project roadmap for the Ohio Innovation Exchange initiative.

Jeff Smith is Technology Director and leads the Shared Infrastructure division of the Ohio Technology Consortium (OH-TECH), an operational extension of ODHE that also includes that includes the Ohio Academic Resources Network (OARnet), the Ohio Supercomputer Center, and the Ohio Library and Information Network (OhioLINK). Jeff leads the database, development, system administration, project management, and desktop support teams. In the context of the Ohio Innovation Exchange, he leads the technical strategy for establishing it as an integral component of the Higher Education Information System (HEI) in Ohio.

We would also like to express our sincere thanks to Tony Kutlu, project portfolio manager at OH-TECH for his help coordinating this interview.

WHAT IS OIEx?

The Ohio Innovation Exchange provides an openly accessible web portal featuring profiles of over 14,000 STEMM-focused faculty experts as well as information about equipment, research support services and intellectual property (IP) from across the higher education system in Ohio. OIEx provides extensive search functionality and an intuitive interface, which allows visitors to find relevant experts and explore each institution's publications, patents and equipment. It also facilitates connections with the OIEx human network, a team of university-embedded, industry liaisons who help visitors find more information and create relationships with researchers and institutions.

Currently the platform showcases research and resources from 6 participating universities, Case Western Reserve University, University of Cincinnati, the Ohio State University, Ohio University, University of Akron and Cleveland State University.

> Participating institutions were invited to submit profiles for people, equipment, research support services and featured patents, or a mix of all four in the areas of science, technology, engineering, mathematics, and medical disciplines (STEMM). This affords us the flexibility to promote the institutional expertise and assets of Ohio universities and community colleges across the spectrum — from research-intensive to more applied technical skills and know-how.

— JEFF SMITH

> The number of faculty experts from each participating university profiled on OIEx at launch in October 2018

CASE WESTERN RESERVE UNIVERSITY	University of CINCINNATI	THE OHIO STATE UNIVERSITY
3298	2532	6825
OHIO UNIVERSITY	The University of Akron	CLEVELAND STATE UNIVERSITY
527	29	204

Jeff Smith commented that it is a key feature of the OIEx that it is not just about showcasing researchers. Equipment and services available in the institutions, and university innovation centers are also very important to the industrial sector. "Participating institutions were invited to submit profiles for people, equipment, research support services and featured patents, or a mix of all three in the areas of science, technology, engineering, mathematics, and medical disciplines (STEMM). This affords us the flexibility to promote the institutional expertise and assets of Ohio universities and community colleges across the spectrum — from research-intensive to more applied technical skills and know-how."

> An example of an equipment profile in OIEx, in this case an electron microscope with details of its geographical location and academic steward

Ohio Innovation Exchange
Initiative of the Ohio Department of Higher Education

electron microscope
Free text in full data

Contact us   FAQ   Register   Log in

Equipment - Instrument
Transmission Electron Microscope
Ohio University

Manufacturer
JEOL

Equipment webpage
https://www.ohio.edu/research/sharedequipment/item.cfm?item=Transmission-Electron-Microscope-1

Description
Imaging of ultrathin sections from fixed & embedded biological specimens.

Fees   **Training**
Yes   Yes

Location

Resource contact
Mark Berryman
berryman@ohio.edu

University campuses often have expensive, specialized equipment on campus such as electron microscopes, which can cost in excess of a million US dollars. Under the right circumstances, companies can request access these resources if needed. For example, small to medium-sized companies needing to analyze prototypes or production line materials might be interested in renting time on microscopes to examine product output, and avail themselves of the technical expertise on hand to assist with the use of the equipment, analysis, and data interpretation. Industry professionals across a variety of sectors often spoke of the need for an easy-to-use portal that they could use to find equipment, technologies, and services.
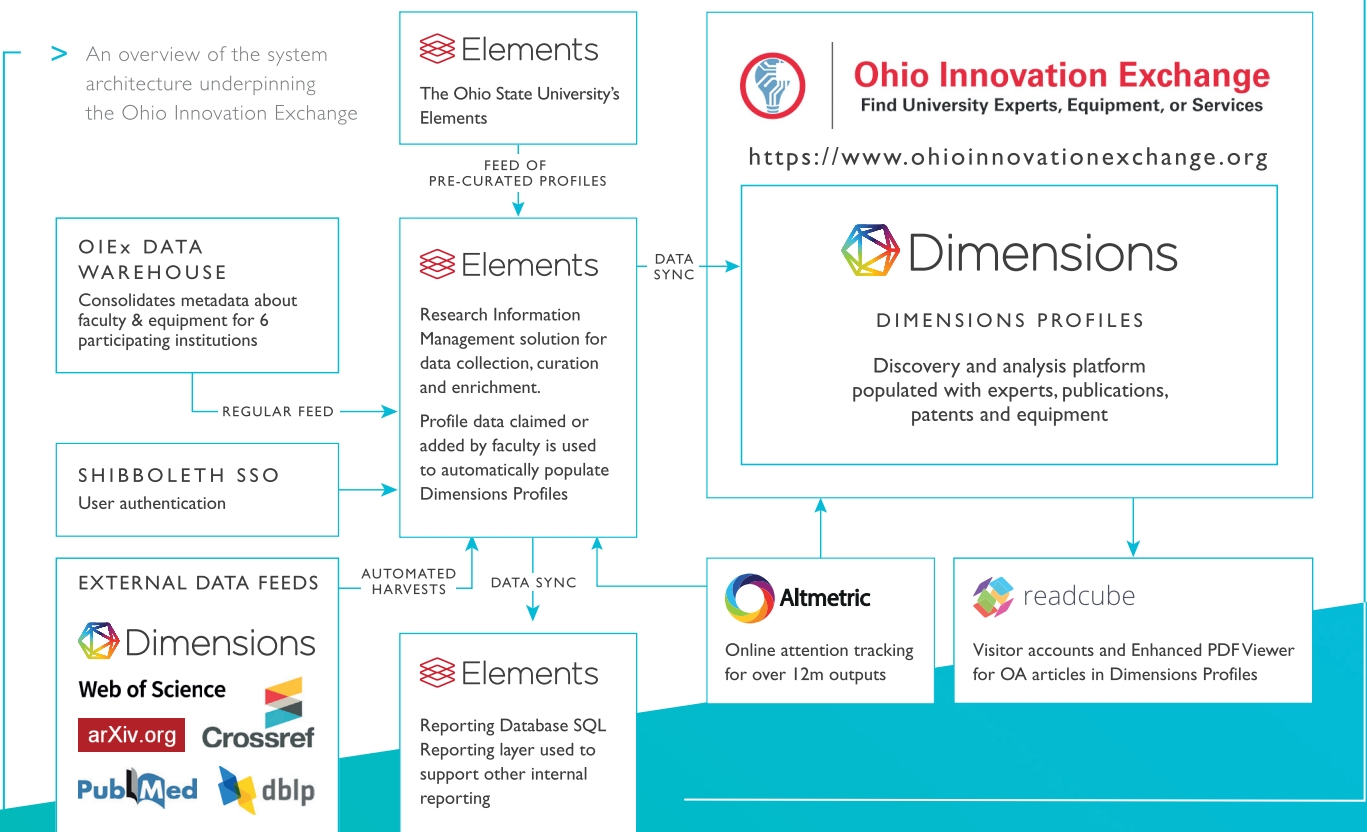
DIGITAL SCIENCE SOLUTION

OIEx combines the research information management capabilities of *Symplectic Elements* and the search and discovery power of *Dimensions*.

Behind the scenes, *Elements* allows OH-TECH to consolidate and curate the data, which powers the OIEx. To ensure OIEx features authoritative information on Ohio's researchers and to minimize the need for manual entry, faculty data is fed into *Elements* by Ohio's Higher Education Information System (HEI) a modern university reporting system managed by Jeff's OH-TECH team. The integration with HEI provides *Elements* with institutional data about researchers and equipment. *Elements* then automatically searches for publications associated with their researchers and brings records into *Elements* to be claimed and curated. *Elements* harvests and disambiguates publication information for OH-TECH from a range of data sources that include: *Dimensions, Web of Science , PubMed* and *arXiv*.

Dimensions Profiles serves as the public front end of the OIEx portal, providing visitors with a wide range of search and discovery tools to help them explore rich collection of experts, publications, patents and equipment collected within the portal. *Dimensions Profiles* is dynamically populated with curated data by *Elements* on an ongoing basis, ensuring the platform is always up-to-date. The platform offers visitors extensive search functionality including filters and analytical features to allow them to find the most relevant information. The platform features a number of customizations such as the Industry Experience flags, which make it easy for visitors to identify researchers who have previous experience working with industry.

The platform also integrates features from a number of other Digital Science portfolio companies. Online attention to research outputs are highlighted in *Altmetric* scores available across OIEx making it easier for visitors to identify and explore high-attention research. *Dimensions Profiles* also incorporates an integration with *Readcube's* Anywhere Access . This one-click PDF viewer technology provides visitors to the site with instant access to open access articles discovered via the OIEx public profile pages.

> An expert profile from OIEx profiling project leader and biomedical scientist Tim Cain. Note the online engagement with Cain's research captured in the latest *Altmetric* mentions.

The Ohio innovation exchange system architecture

> An overview of the system architecture underpinning the Ohio Innovation Exchange
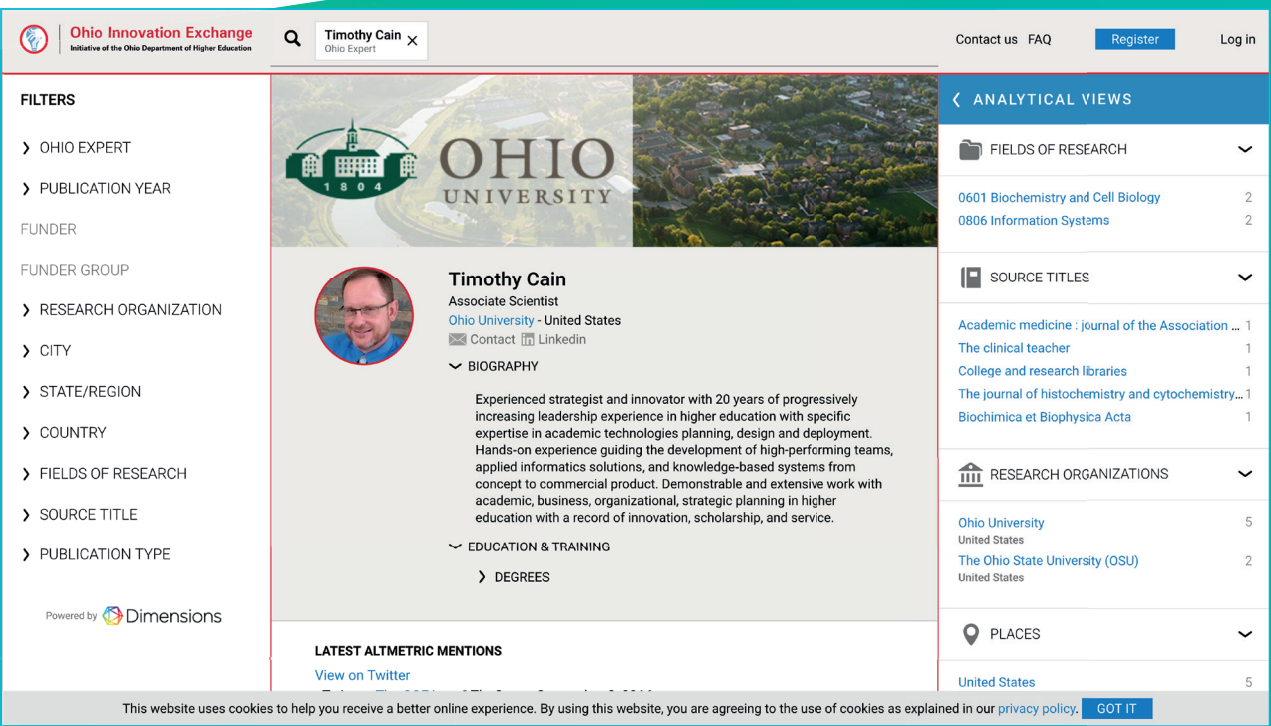
PROJECT GENESIS

BACKGROUND TO OIEx

Tim Cain described the circumstances that led to the design and deployment of OIEx. The project first arose from a key recommendation from a 2013 report on the Condition of Higher Education in (the state of) Ohio which had been commissioned by ODHE and authored by academic officials, policy makers and vested industry leaders. The Report detailed strategies aimed at advancing Ohio's innovation economy by fueling collaborations across the sectors of academia, business, and state government. The Report spoke to the importance of stimulating cross-sector work to help ignite breakthrough science and technology innovations, accelerate laboratory bench to production floor translation, and fuel economic growth and jobs creation.

One recommendation detailed in the Report was a call to explore the feasibility of creating a statewide portal to showcase, share and promote university/college faculty, research strengths, assets and equipment.

ODHE committed to this recommendation in 2015 and commissioned a feasibility study to explore how best to stand up a multi-institution, research expertise and asset portal. It was at this point that Tim Cain joined the project and helped complete the feasibility study. Tim recalls, "We looked at the modern ways in which universities were managing their research information. We looked at the products out there on the market. While doing something as a multi-university initiative would prove challenging, we were convinced modern digital strategies would enable us to accomplish the task. ODHE secured funding through its capital appropriations budget to seed the initiative and assembled a coalition of willing, research-intensive universities that included: Case Western Reserve University, University of Cincinnati, the Ohio State University, and Ohio University. Over the next four years, each of these universities contributed in-kind, staffing expertise and support from a variety of domains – academic research, library/data, technology, and industry engagement."

DATA FIRST APPROACH

In addition, the Ohio Manufacturing Institute was an early participant to help bridge and explore collaborations between the manufacturing industry and academia. Tim stresses the importance of adding Ohio Manufacturing Institute as a partner: "They brought a customer perspective to the table to insure we didn't end up with a project team and solution geared exclusively for academics. We quickly realized that the categories of information that may be valuable in the academic arena might not have the same value to an industry-focused audience. By having an industry voice at the table, we were trying to ensure that we did not miss the mark. It was an all-volunteer army, who aligned to the idea that these institutions are part of the state and that it was part of their mission as well to help achieve effective higher education-industry collaboration."

The OIEx feasibility study looked carefully at the historical barriers to higher ed-industry collaboration. Tim commented, "Industry officials would often report on the challenge of finding experts in academia. While industry was more than willing to call upon the expertise of university faculty or try to seek research services, equipment or IP, they suffered from diminished visibility into the key academic assets." Tim explains that the barrier is the way in which universities are organized in the digital world. Universities are highly decentralized and have information managed by many different departments and in many different locations. "There's plenty of information on the Web on academic expertise, but it's all over the place. With OIEx, we wanted to create a single, multi-university resource that provide enhanced visibility into expertise, equipment and research support services and available IP."

From the outset of the OIEx project, it quickly became clear that each of the participating schools managed their research information sets in a myriad of different ways. There was no consistent research information platform used by each Ohio institution. Tim explains that the project team recognized that if they were to be successful they would have to honor the investments the universities had already made in systems and that it would be a mistake to suggest supplanting these existing systems and institutional workflows from the level of the state.

In a strategic masterstroke, the team designed the project to focus on "data first", working with the participating institutions to identify, assemble and source simply the data. Tim says, "We didn't care what systems were used locally to manage the data. In one case, a category of data was tracked and managed locally in analog form. Often universities would not have enterprise-level visibility into this data because it is managed at a department or unit level. We had to honor this culture, especially as the institutions were volunteering the time and effort of their staff to go out and find this information."

Tim adds that the ways in which each of these universities interact with industry was also very different. "For some, it was a one-person show, for others, it was a robust office of individuals working across the scope of the institution. Also, from a cultural perspective, separate schools didn't really work together in technology transfer and industry engagement." Tim explains that it wasn't a case of these schools being highly competitive with each other, but rather that as they had each grown with their own industry engagement offices, collaborating with the school on the other side of the state was not the first thing they thought about. Tim continues, "We had to rethink the rules of engagement with these schools. We had to try to build a culture that meant that if an enquiry from industry was received by one school, and if the required expertise was recognized to be in another school, then this enquiry could easily be passed from one school to the other."

The project team worked with the participating schools to target the data of interest and progressed through to develop a central strategy for data submission. Each of the participating institutions then went to find that information.

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TECHNICAL PERSPECTIVE ON OIEX

Jeff Smith and his team oversees the support and security of the centralized data warehouse in which the seed data about faculty and equipment resides. Jeff and his team also look after the mechanisms, processes, and specifications through which the participating universities would submit data to the central data warehouse ready to be fed into *Elements* for curation and enrichment.

Following their data-first approach, they looked to established mechanisms used for reporting requirements of the universities to the State Government. HEI housed at OH-TECH already provided the inputs for data areas of academic programs, enrollments, facilities, faculty and staff, financials, and financial aid for students for reporting to the State and Federal governments. It was determined that HEI could provide OIEx with much of the faculty and staff data they needed. Jeff Smith comments, "We added an additional data area to the system and now we have a central data feed point for OIEx where faculty and institutions can come and submit those files specifically to a faculty directory of activity, qualifications, honors and awards. This is what goes through to the OH-TECH instance of *Elements* in OIEx. It all has the same front end on the campus side and we take this and route it to *Elements*."

NEVER REKEY THE DATA

Jeff says that ensuring faculty members would never have to enter data into the system more than once came up early in the discussion. The team at Ohio State University (OSU) raised this key consideration; OSU had already implemented *Elements* on campus to support their promotion and tenure process. Jeff says that OH-TECH wanted to leverage the high level of data curation already completed in the OSU *Elements* instance and so they turned to the Digital Science team for a solution. Jeff commented that this is where the Symplectic product management team led by Kate Byrne and Dave Budenberg really stepped up and presented us with an option, which was fairly new to us. Jeff says, "In OIEx, we connected two *Elements* systems together so that the data from the OSU instance remained the authoritative source for that institution and fed the curated data to the OH-TECH *Elements* instance in OIEx." Jeff says this allowed them to realize great efficiency by leveraging the OSU source of authority for their faculty data along with the publication curation. "We imported this data directly in real time via API calls from the OSU *Elements* instance to the OH-TECH *Elements* instance. Elegantly, the data is locked and cannot be enhanced in OH-TECH, so OSU retains the single source of truth for the data it submits to OIEx."

DIGITAL SCIENCE DELIVERED

Jeff says that decision to award the state-initiated, request for proposals (RFP) to Digital Science was largely based on a need for an off-the-shelf, vendor supported solution. "We did not want to invest in a custom-developed application because although OH-TECH does have an IT staff we didn't have resources that could be dedicated to this project for some number of years. There would be too many unknowns: How long would it take to build OIEx? What would be the best way to take it to market? Would the project be too costly to deliver? We also wanted to install and on-board institutions quickly."

The project team looked at several different options from vendors and Jeff says they were impressed by the polished look and feel of the *Symplectic Elements* user interface.

"Ultimately, the faculty were going to be asked at some point to go in and curate their profiles and we had to think what would be the easiest tool for them to use. We also looked at the data attributes that were required for the project and these mapped quite well to what was available from *Elements* out of the box. The publications and citations data sources in *Elements* were also impressive. OhioLINK, a membership consortium of nearly one hundred and twenty academic

libraries in Ohio, holds a statewide contract for *Web of Science*, which facilitates access to this A&I database for the six institutions participating in OIEx. We could turn on the *Web of Science* data source for harvesting inside *Elements*, and this was a big leg up for Digital Science in the RFP."

Tim adds that the RFP was designed to be ambitious in its scope. The project team mapped out over one hundred functionality requirements desired in the technology layer. These included handling the data complexities, tapping into licensed data sources provided by OhioLINK and other third parties; reporting and modern analytics, and social media. Tim says: "The solution needed to be more than an online phonebook of information. We received 15 competitive submissions, and Digital Science's submission quickly rose to the top in meeting our requirements. Digital Science also demonstrated that they understood the drivers of higher education; the complexities of institutional data, the decentralized and myriad ways this data is often managed, but most importantly, they could point to proven strategies and ways to deal with that. We also wanted a provider who was at the forefront of modern informatics, one who was progressive in its thinking of how to integrate data sources such as *Altmetrics*. These are things we might not think about now but would be important further down the road."

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CHALLENGES IN THE PROJECT

Jeff and the technical team at OH-TECH thought strategically about the challenges upfront at the start of the project. Disambiguation and strategic collection of the data were primary concerns. Jeff recalls: "We identified that we would do this through the Higher Education Information System, but there were a variety of ways people were managing this data locally in the participating institutions, and some of the data processes were even analog." Jeff and his team considered questions about the challenges associated with the data workflow such as, how were they going to keep OIEx up to date? How would they be able to motivate people to participate and stay on top of the data? And how once they overcame the technical challenge of moving data through HEI to the *Elements* platform and on to the OIEx portal, would they handle data curation? Jeff stresses that they had to figure out the most strategic way to approach this from the perspective of faculty, minimizing frustration for these end users of the system. Jeff adds that Digital Science helped here by providing high quality support for the use of federated logins established on campus, and by presenting faculty (and their administrative delegates) with a very intuitive, user-friendly interface in *Elements* to make it as easy and as quick as possible for them to submit or claim their data.

MAKING OIEX A SUCCESS

Tim, Jeff and the OH-TECH working group were keenly aware from the outset of the OIEx project, that it would not be enough to build a portal to expect end users and public visitors to engage with it. They had learned this from looking at other state models. Tim adds: "The Web doesn't need another watering hole. We needed to think about the customer service around the portal." So in parallel to specifying and releasing the technology layer, the working group engaged in building up a human support network around the portal. "We had ongoing conversations with the professionals at each participating university whose role it is to interface with industry. These people have been thinking about the hand-offs, the triaging and workflows around the system, all the basic customer service tenets that would help the portal realize real engagements between academia and industry. Because we are building this human network around the portal to support it, we will get richer information on interactions and collaborations. It's a work in progress and we hope to demonstrate that the portal is generating interactions that are leading to meaningful collaborations."

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