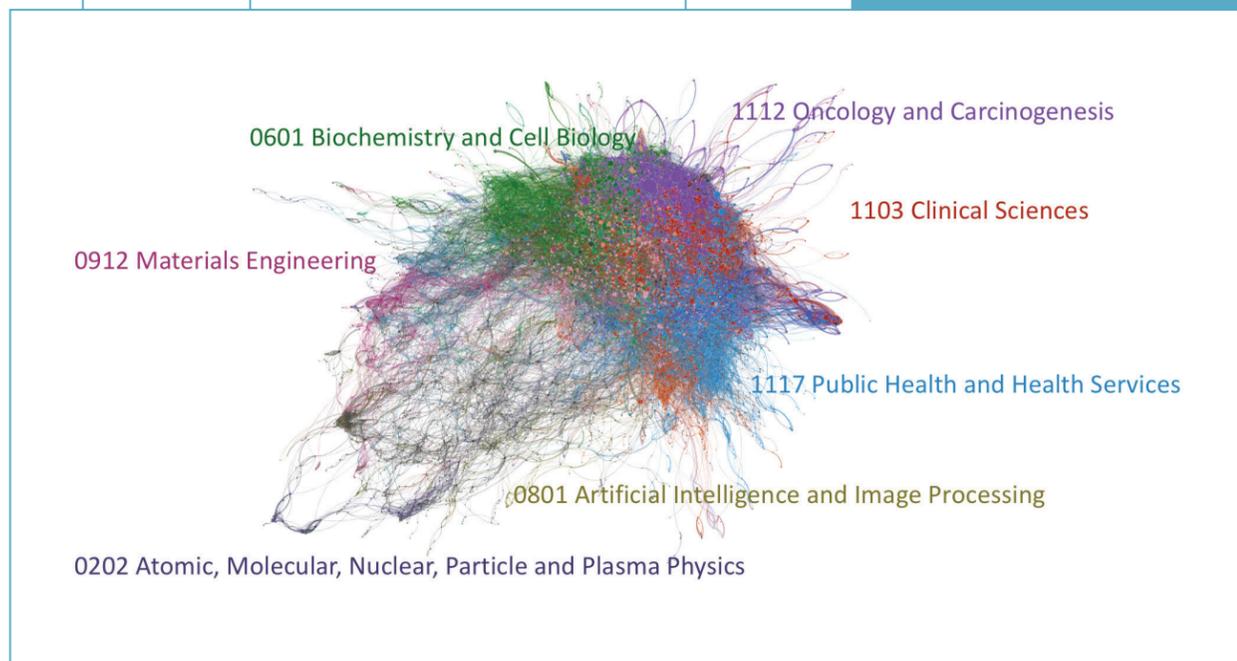


CONNECTIONS, COLLABORATIONS & IMPACT

Data-driven approaches to
understanding institutional
research expertise

Developed and written by
Kate Byrne and Stephen Cawley



> The University of Michigan's research categorised by Fields of Research. This data visualisation was created by the Digital Science Consultancy team



The University of Michigan has just launched a new searchable database of their research expertise using a Digital Science solution built on Elements, Dimensions, Altmetric and Readcube technology. We interviewed Caleb Smith, the Senior Strategy Manager for Research Intelligence and Analytics at Michigan Medicine Office for Research, on the strategic rationale and goals for the project.



Michigan Research Experts features over 4,800 experts from the University of Michigan and their associated research outputs.

The University of Michigan has just launched Michigan Research Experts as a portal to showcase their research expertise and help their research community to foster collaboration on campus, and beyond. The portal is publicly accessible at <https://experts.umich.edu>

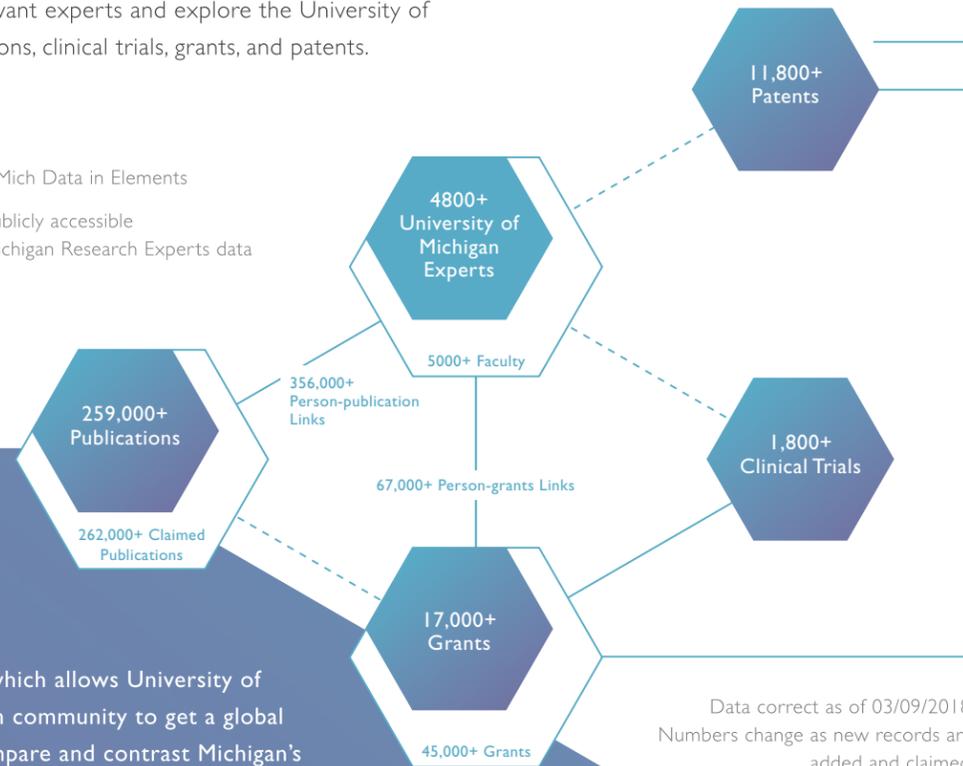
Michigan Research Experts features over 4,800 experts from the University of Michigan and their associated research outputs, with plans to soon expand coverage to all faculty pursuing research at the University. It also offers additional metrics and tools such as citation counts, Altmetric scores and direct links to open access publications via the integrated ReadCube Viewer. Developed in partnership with Digital Science, the portal brings together the search, discovery and analytical capabilities of Dimensions Profiles and Dimensions Plus with the research information management capabilities of Symplectic Elements, the immediate online attention and policy document tracking capabilities of Altmetric, and some of the article discovery and reading capabilities of Readcube.

Michigan Research Experts is designed to operate as a single consolidated source providing easily accessible insight into the breadth and depth of research expertise across the University of Michigan, based on a curated, enriched collection of data about their research.

Michigan Research Experts, combines components from a number of Digital Science portfolio companies. Under the hood you'll find:

Dimensions Profiles, a search and discovery portal that allows the University of Michigan System to showcase their expertise to other researchers and potential commercial partners. The extensive search functionality and intuitive interface allows visitors to find relevant experts and explore the University of Michigan's publications, clinical trials, grants, and patents.

 UMich Data in Elements
 Publicly accessible Michigan Research Experts data



Michigan Research Experts captures curated data about the institution's research activities which can be explored both through Elements and Dimensions Profiles

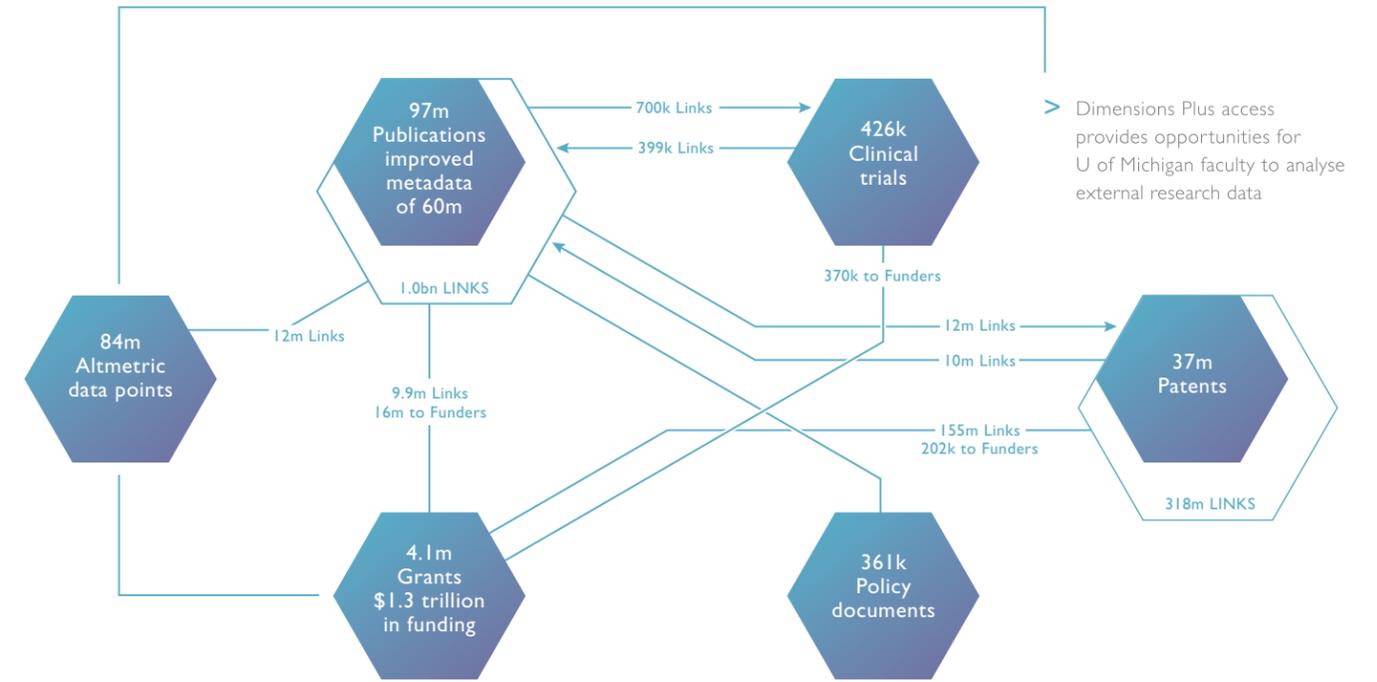
Data correct as of 03/09/2018. Numbers change as new records are added and claimed.

Dimensions Plus, which allows University of Michigan's research community to get a global perspective to compare and contrast Michigan's research activity, by using faceted searching and research categories to explore over 97m publications, over 4m grants, over 37m patents, over 400k clinical trials, and over 300k policy documents, and the established links between these content types.

Underlying the Dimensions Profiles 'public front end' is Elements, a research information management solution and a robust system of record for university reporting needs. Each faculty member conducting research within the University of Michigan has their own profile which is populated with data from Elements. This expert profile can include their name, position and institution, a photo, a research overview, information on their degrees and certifications and their awards and honors and links to Twitter and LinkedIn. It will also display their publications, grants, and collaborators as well as showing their citations and their latest Altmetric mentions. Crucially, the researcher retains control over what can, and will be displayed in their public profile.

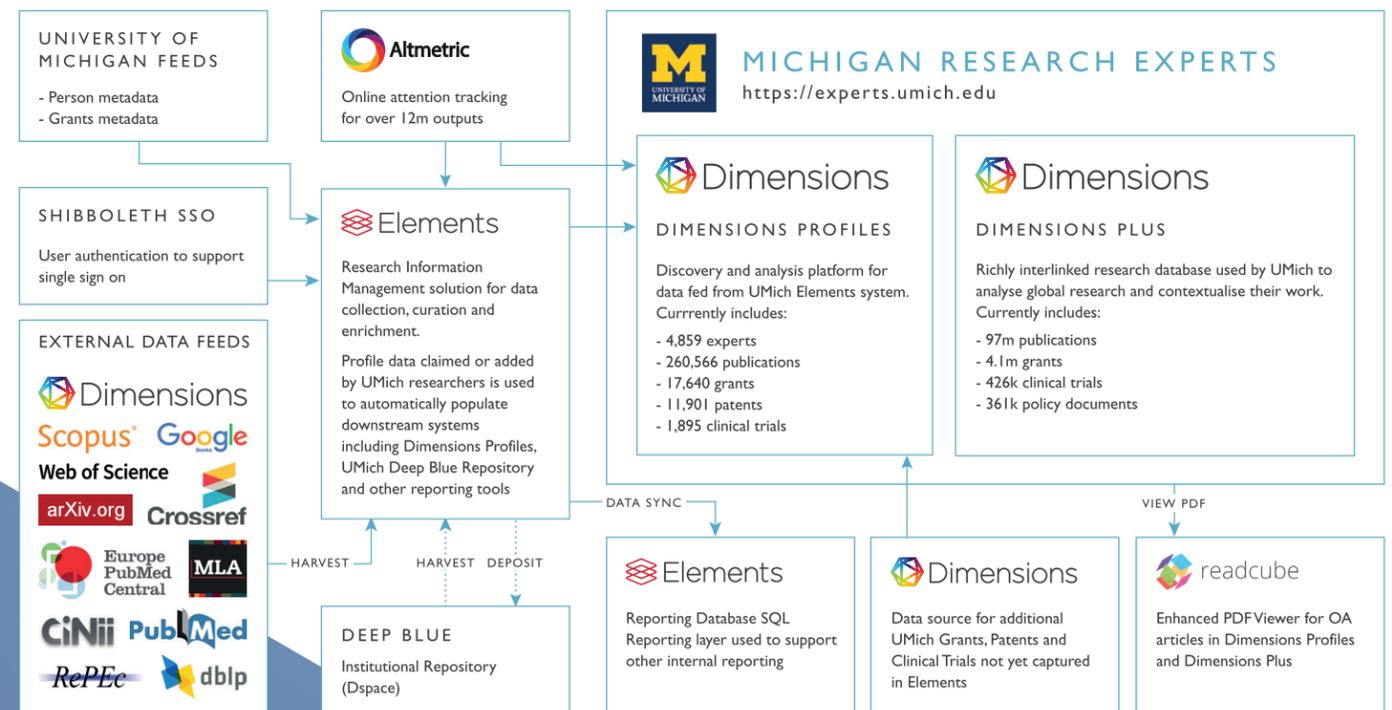


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Dimensions Plus access provides opportunities for U of Michigan faculty to analyse external research data

The Michigan Research Experts Information Architecture



This is a diagram showing the underlying information architecture and connections behind Michigan Research Experts

WIDESPREAD INTEREST

Michigan Research Experts was launched on July 1, 2018 and the project is led from a strategic perspective by Caleb Smith. Smith explains that although the original executive sponsorship for the project came from the leadership at the Medical School. Smith worked on the project with colleagues from departments across the University of Michigan including Rebecca Welzenbach from the Central Library, Laura Hessler and Faye Poulos from Project Management; Steve Gendler, Director of Lab Research and Technology Solutions; Jim Jeffries, Product Application Manager; and Lorrie Harvey, Lead Application Programmer and Analyst, from Health Information and Technology Services.

Other senior members of the research community beyond the Michigan Medical School are seeing the value of the data and utility in the portal. Smith remarks "We put on campus roadshows to promote Michigan Research Experts, and leaders from across the institution showed significant interest in the system." Smith expects the interest to expand as the project evolves.

STRATEGIC GOAL

Smith's long term strategic goal for Michigan Research Experts is for "it to become the default repository for all University of Michigan research outputs metadata. This would be the single source of truth for tracking all metadata concerning faculty research outputs - not just traditional publications, grants and clinical trials - but also non-traditional research outputs such as software packages and other types of grey literature; including evidence of public service and of impacts." Smith says that, in time, he hopes the system will help answer a broader range of questions about their research outputs such as:

- What are all the grey literature publications coming from, for example, the Medical School?
- How are University of Michigan research data sets being used by other Michigan faculty?
- What are the broader impacts of University of Michigan research activities?
- What are the service activities of our faculty?
- What are the topic-level research portfolios of our schools and departments?



> The Michigan Research Experts Project Team.
Back row, L-R: Steve Gendler, Caleb Smith, Jim Jeffries.
Front row, L-R: Laura Hessler, Becky Welzenbach, Faye Poulos

REASONS FOR INVESTMENT

The University of Michigan had technical, policy and business-related motivations for looking to move from using a single source of publication data to a broader system of research outputs metadata, as Smith explains.

Smith commented that historically, publications and grants from the Medical School have been relatively easy to track, however they started to see this change. "The Medical School was already well covered in sources such as Pubmed. But as we increased cross campus interdisciplinary collaborations, we started seeing work from the Medical School appear in sources in Computer Science, Engineering and even in the Humanities and Social Sciences. This pushed us to look at using new systems such as Dimensions that could track research outputs across multiple domains using broad interdisciplinary categories such as Fields of Research (FOR codes)."

There were also some powerful policy motivations for moving to a new system. Smith says "Funding agencies who sponsor University of Michigan's research activities want to see return on investment. This translates into the university system being able to demonstrate health and societal benefits arising from the research activity undertaken." He added that state legislators are often more interested in what the public make of the research activity than what academics think.

"When we speak to our law or policy makers, they are interested in what their constituents are interested in. How often does our research appear in Wikipedia and social media? What is being talked about in the news? They are less concerned with academic citations."

When it comes to tracking public attention, Smith says Altmetric is probably the best measure, with both social mentions and policy documents mentions being tracked. These Altmetric mentions are included as they happen in the expert profiles in Michigan Research Experts.

Dimensions contains a rich collection of data for grants, publications and clinical trials which has been enriched with unique identifiers and is available programmatically via APIs. These tools will help Smith's analytics group undertake these kinds of data mapping and joining exercises.

> A brief biosketch for the faculty expert, and an Altmetric feed showing the public attention to the expert's research are displayed on the profile page. Publication records for the expert are also accessible, as are collaborating experts from the University of Michigan, and certain analytical filters

Smith cites strategic hiring as the third reason they chose to invest in Michigan Research Experts. He says "We want to track the constellation of research topics and impacts produced by our faculty so that when we reach out to recruit junior and senior faculty, we can have greater confidence that any potential new hires will have a place within the social network we have created. We want to know if potential hires produce similar levels of impact, and academic research of similar prestige and influence to that of current faculty."



As the faculty profiles within Elements can be manually curated, the University of Michigan now has the ability to track what has been traditionally considered “grey literature”.

BENEFITS OF THE NEW SYSTEM

Prior to implementing the new system, all publication measures were coming from Scopus data alone. However, Smith noted that we know that there are over 200,000 journals published globally and we won't be getting a full picture if we base our viewpoint on an index of 24,000 journals. Smith said that with Michigan Research Experts and the use of Elements for publications harvesting and faculty profiles management, University of Michigan is able to get a census of all of their publication activity from across all disciplines for the first time, especially in the humanities and social sciences, and across multiple sources including Arxiv, Crossref and Pubmed.

As the faculty profiles within Elements can be manually curated, the University of Michigan now has the ability to track what has been traditionally considered “grey literature”. This includes software code. Smith believes that “This will help to bring transparency to the richness of thought showcased within non-traditional publications, providing a more holistic representation of faculties' scholarly work.”

CONCEPT SEARCHING IN THE FULL TEXT

Dimensions Profiles and Dimensions Plus offers something unique for new faculty joining the institution, Smith says. New to the university, they often want to build their network and find potential collaborators and Dimensions can help.

“They are often interested in a specific technique or a specific piece of equipment and they need to find expertise on these things.” In Dimensions, users can run a topic search across the full text, going beyond a title and abstract search. Genes, chemical composition, and protocols, the kinds of specific concepts a researcher might be looking to explore, mostly appear in the body of the full text and not in the title and abstract of a publication. For the first time with Dimensions, Michigan researchers can search through the full text, so if a researcher wants to find someone working in the HNBCI gene, they can find everyone across the University of Michigan System interested in that gene. They can dig deep into the papers to see whether a colleague is interested in it as, for example, an indicator of comorbidity, or to see if a publication on that gene is truly original research. They can also extrapolate who are the CRISPR experts or who are the experts on a specific machine. Researchers at Michigan can also use Dimensions Plus to see who is being funded to do this research and which sponsors are funding them offering pathways to reach out to key colleagues in their field.

FIND FUNDING, IMPROVE SUCCESS RATES

Dimensions is uniquely positioned to help Michigan faculty improve their grant application success rates. Smith estimates that it takes a researcher, on average, 200 hours to compile an NIH proposal. Applicants are rejected 66% of time and this translates to approximately 200 hours of opportunity cost to the institution and the individual researcher. Smith says “We use Dimensions Plus to help increase the lifetime of that grant application. Researchers will do this by taking their grant proposal abstract and running it through the abstract search engine in Dimensions Plus. By doing this, they will quickly find out who are the major sponsors in the world that would be interested in funding research like theirs. They can also see the individual researchers these sponsors have funded, how much funding they received, and if they are in the US or elsewhere. It gives Michigan

researchers good ideas on where to submit their proposal to next, helps them put together a list of collaborators who they could work with on proposals.” Smith says this use case is resonating with faculty.

Dimensions also helps Michigan faculty prepare to respond to unsolicited requests for applications (RFAs) from major sponsors. Smith says “In the RFA, a sponsor describes exactly what they are interested in a solicited proposal, then this RFA abstract can be plugged into Dimensions and we can quickly find all Michigan faculty who could apply for these grants. We then let them know if they appear to be well-positioned to apply to the RFA. Finding funding is the major struggle for researchers. If you can give them targeted opportunities, this is very valuable.”



Dimensions is uniquely positioned to help Michigan faculty improve their grant application success rates.

USER TYPES FOR MICHIGAN RESEARCH EXPERTS

Beyond individuals seeking expertise, Smith sees two types of users for Michigan Research Experts. First, there are power users, who he anticipates will more often than not be academics who want to process data in a data science context for statistical modelling or for generating lists of rising stars and classifying them. Then the second type of users are business users who want to use the data but do not want to get into the nitty gritty of how the data is structured. Typically, they need to perform a really quick analysis on the fly. Perhaps a Dean is hosting a foundation representative and would like to see examples of our past work with that group. Or perhaps one of institutional leaders is preparing for a legislative meeting and would like to prepare some targeted talking points ahead of time. Dimensions can help them prepare for these events quite easily.

EXPERTS SYSTEM ROLL OUT

The University of Michigan has elected to use a staged rollout, starting with the soft launch of a beta edition whilst the data is being enriched. Smith says “Although we went live on July 1st, the promotion to faculty began in September. Smith believes a snowball effect will occur with the project where “the more research output metadata is entered into Michigan Research Experts the more it will become the single source of truth, and then the more institutional processes rely on the system, the more faculty will engage with the system.”

Smith says that the next phase in the project will see Elements being linked to the Deep Blue institutional repository. The library will encourage faculty to deposit their publications, datasets and software code to Deep Blue through Elements as a depositing interface, reusing the metadata already collected there. “The more people we can get to touch their profiles, the better the data quality will be.” After that, Smith says the project team will work with Faculty Affairs to look at impacts and public service. “The more we do, the better the system gets, the better the system and the data gets, the more we can do.”

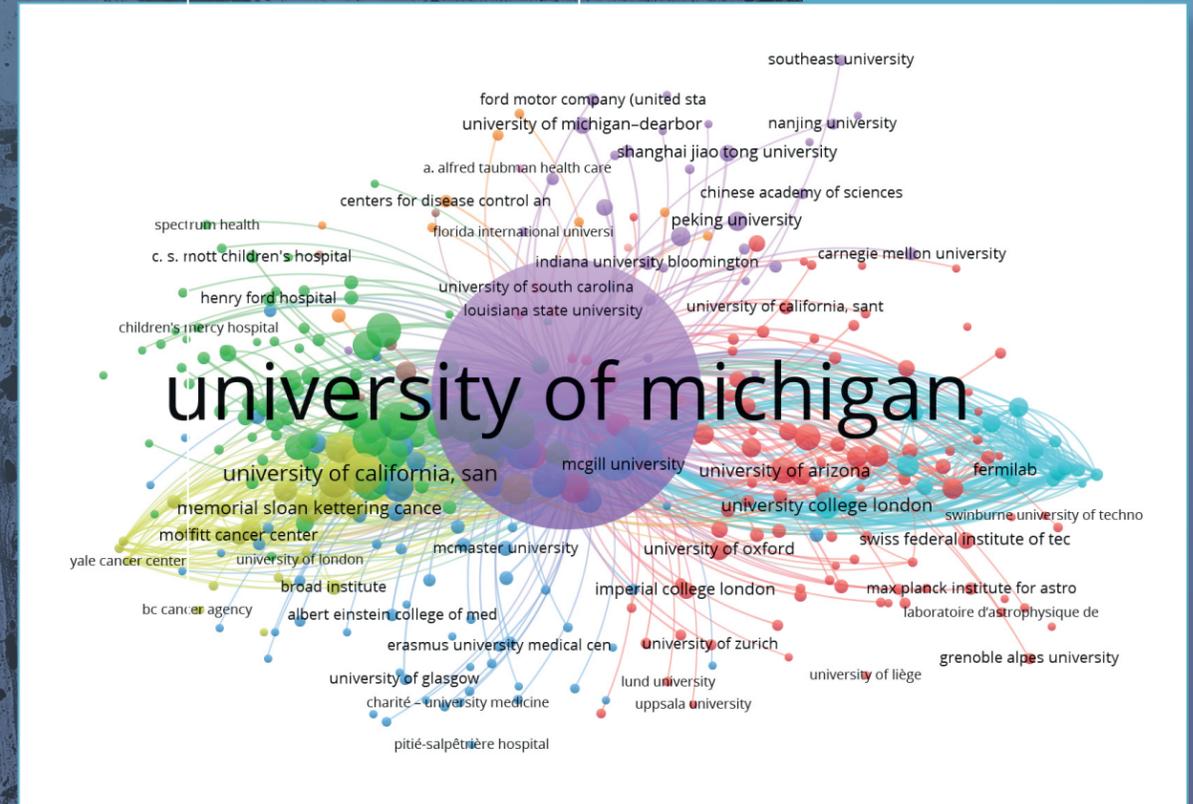
Ultimately, Smith says we don't control large publishers and their sustainability so it was important to them to have their own rich collection of data about their research. “Michigan Research Experts collects the data that a public institution has produced on the public dime. We need an institutional record so that we can ensure that it remains available to researchers in the future.”



The more research output metadata is entered into Michigan Research Experts the more it will become the single source of truth.

PARTNERSHIP BASED ON SHARED PHILOSOPHY

In closing, Smith was extremely positive about the partnership with Digital Science and the portfolio companies. “I cannot overstate how pleased we have been. It was very pleasant to deal with Digital Science, whose technical resources have been fantastic to work with. The Digital Science team have recognized our concerns and dealt with them efficiently and that gives us a lot of confidence to move forward. We have to have confidence to work with a partner for at least 5 years on a project of this size, and when it came to philosophy, Digital Science were the most closely aligned to us. Digital Science is also nimble. In the past you could bring up a problem and other vendors throw up sales people, Digital Science presents technical engineers to fix the underlying problem.”



> The VOS Viewer visualizing collaborations between the University of Michigan System and its external partners

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