Research Liaisons: the next layer of Facilitation

Research Liaisons

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ABSTRACT

Research productivity has been greatly enhanced by Research Computing Facilitation teams to help researchers maximize their use of advanced cyberinfrastructure. However, researchers have more technology needs than just advanced cyberinfrastructure, such as data management and instrument device support. To address this, the Academic Engagement team in Michigan Medicine added Research Liaisons as another layer of human support on top of the Facilitation team.

The Liaisons are relationship builders. They are assigned to departments to build deep relationships with them and start proactively addressing labs' technology needs. They also build relationships with other teams, notably enterprise storage, enterprise networking, and research core facilities. These relationships allow Liaisons to provide a connective tissue between the researchers and IT teams.

CCS CONCEPTS

• **Social and professional topics** → Professional topics; Computing profession; Computing occupations; Professional topics; Management of computing and information systems; Project and people management.

KEYWORDS

Cyberinfrastructure workforce development, cyberinfrastructure facilitation, research computing facilitation, research liaison, relationship building

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1 INTRODUCTION

It is now well established that any advanced cyberinfrastructure (ACI) must include personnel to help researchers leverage the ACI for themselves. The Advanced Cyberinfrastructure - Research and Education Facilitators (ACI-REF) project (NSF #1341935) was highly successful in demonstrating this, producing numerous resources for other institutions to develop their own ACI personnel (called Facilitators in the ACI-REF project). Michael and Mass provided a focused look at a Facilitation program in practice at an institution [5]. Since then, numerous groups have formed to advance Facilitation, such as Campus Research Computing Consortium [11], the OU Virtual Residency [7–9], campus champions [2], and Cyberteams [3, 4, 6].

Facilitation has provided a much-needed human element in the support of ACI. Given the complexity of advanced computing projects, institutions need a Facilitation team that focuses on ACI. However, researchers have the same needs for "regular" cyberinfrastructure support. Institutions often offer many IT services beyond just ACI, such as general storage, device support, databases, and software. At an academic medical center like Michigan Medicine (the University of Michigan's health system and medical school), security requirements are also a large factor in research. All of these services could advance research if researchers only knew about them and how to maximize their use. Even many experimental labs that analyze data on ACI need to transfer their data to the systems first. Inspired by Michael and Mass, Michigan Medicine

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(MM) sought to address this gap with a new layer of human support on top of Facilitation: Research Liaisons.

2 LIAISON PILOT PROGRAM

For many years, researchers had been increasingly frustrated with the MM central IT department, Health Information & Technology Services (HITS), and the level of service they were receiving. The Academic Engagement team in HITS set out to address this with the Research Liaison Pilot program.

2.1 How the Liaison program works

The Liaisons don't provide or support any endpoint services used by researchers at MM, including ACI. The Academic Computing team supports ACI for MM researchers, staffed by Facilitators. Instead, the Liaison team provides a connective tissue between all the IT organizations and teams within. Broad duties include:

- Navigating U-M's complex IT ecosystem
- Teaching researchers how to tap into HITS services
- Providing recommendations based upon IT needs
- Identifying patterns across the MM academic mission
- Identifying gaps in IT support and advocating for value-add service changes
- Enhancing HITS service capability and efficiency

To do this, the Liaison team must build and nurture trusted relationships, learn and connect the breadth and depth of IT services available across the university, and be genuinely curious about the work of the academic community they serve.

The initial pilot was staffed by five Liaisons. They were charged with forming deep relationships with the departments and understanding their needs proactively instead of reactively. This was accomplished through regular office hours, group meetings, one on one consultations, and lab walk-throughs (before COVID) in addition to the standard support given on an ad hoc basis. Today, the Liaison team has established support engagements with 11 departments and serves the rest of the MM academic community through a significant amount of ad hoc support.

2.2 Goals of the pilot program

There were four main goals of the pilot program:

- Establish pilot engagements in six departments
- Provide better IT services for researchers
- Help researchers navigate the IT landscape
- Form relationships with other service providers

Goal 2 would be achieved by forming deep relationships with departments and would be measured through an initial survey before the pilot and a follow-up survey when the pilot period ended. Goal 3 centered around the HITS ticketing system and routing tickets appropriately. For Goal 4, there were two specific service providers in mind: Advanced Research Computing (ARC), the University of Michigan's (UM) unit for ACI, and Information & Technology Services (ITS), the central IT department for all of UM.

2.3 Results of the pilot program

All four goals were met during the pilot period and some well exceeded their targets. The pilot ended with seven departments, one more than the target goal of six. The initial and follow-up surveys were analyzed using the Net Promoter Score (NPS) method [10]. Figure 1 illustrates the results for two selected survey questions.

For both questions, the NPS increased by ~40, going from negative to positive. This suggests that the Liaison program met Goal 2 as well. Numerous anecdotal stories from the Liaisons also support this. Dr. Pierre Coulombe, G. Carl Huber Professor and Department Chair of Cell & Developmental Biology, has this to say about the program:

> "The Liaisons are instrumental to the success of IT support in research."

When examining the ticket data from the pilot period, it turns out that the Liaisons sent tickets to every HITS team on behalf of their departments, successfully meeting Goal 3. Finally, for Goal 4, the Liaison team did form relationships with ARC and ITS, but also formed relationships with Facilities, various vendors, internal research core facilities, and even the Division of Public Safety and Security (physical security).

3 HOW WERE THE LIAISONS ABLE TO ACHIEVE THIS?

More important than what the Liaison team accomplished is how. This section of the paper describes how all of this was achieved with the aim of helping other institutions replicate the program and success.

3.1 How were resources for the team obtained?

Erin Dietrich, the recently hired Senior Director for Research, was responsible for securing the resources for the team. To get the FTEs to create Academic Engagement, she started with a vision of the program. She developed this into a strong business case and sales pitch that were presented repeatedly to leadership in HITS and the Medical School as part of a larger strategic vision of what research IT support should include. When she began at MM, her focus was on how to organize the research division to best support research efforts at MM.

She used portions of the McKinsey 7-S framework [1]. This is a common model used to think about organizational effectiveness. It was created in the early 1980s and has persisted. The basic premise of the model is that there are seven internal aspects of an organization that need to be aligned if it is to be successful. Erin focused on Strategy, Structure, and Staffing. She outlined the strategy for Research IT which included the Academic Engagement team and Liaison program, then presented to leadership multiple times. Erin's persistence was invaluable. Once enough support was garnered, she then executed on the formation of the team (structure) and the staffing. The creation of this team included two equally important resource pools: 1) existing resources with expertise and skills that shifted toward a Liaison role and 2) incremental FTE that were requested through the traditional processes.

3.2 The composition of the team

The Research Liaisons are a team of IT professionals committed to providing great customer service. Their work begins and ends with enabling researchers to conduct their research. Together, the team

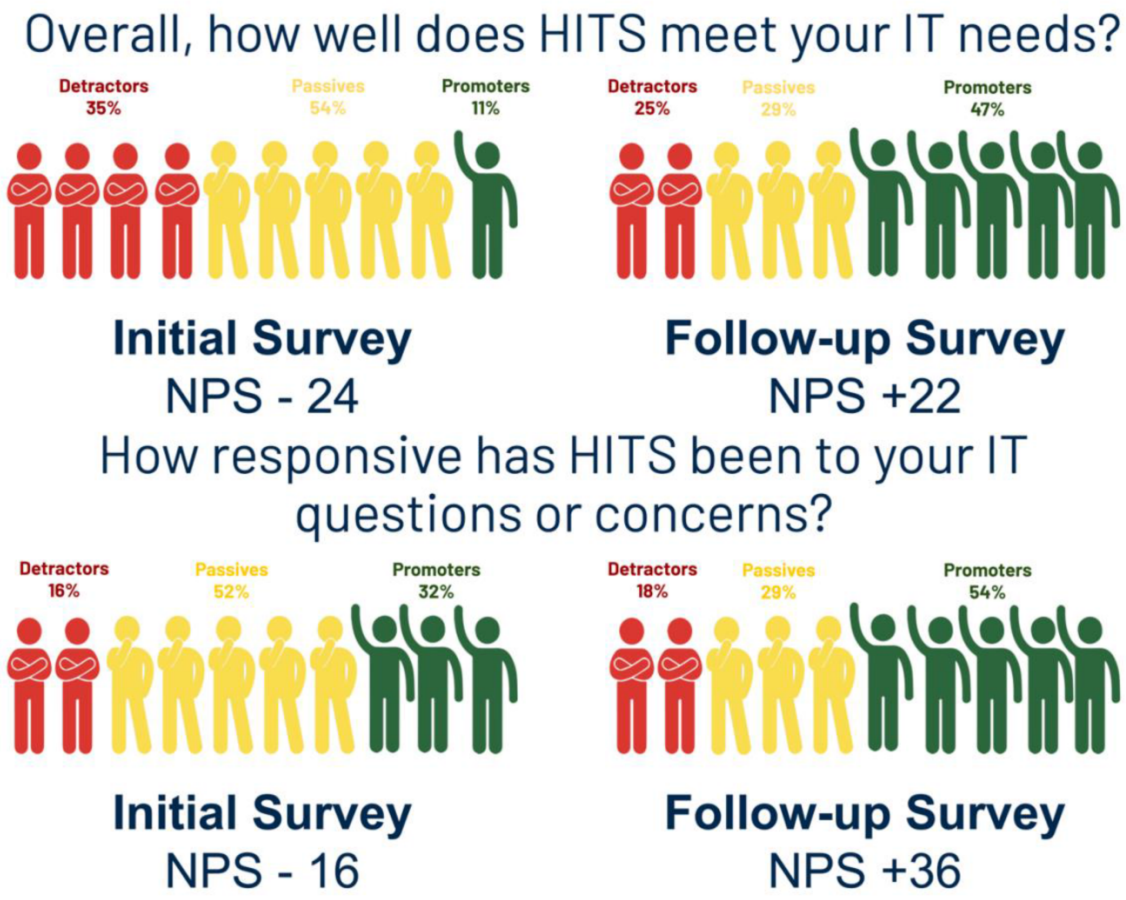

Figure 1: Results of an initial survey taken before the pilot began and a follow-up survey after the pilot period ended for two questions. Surveys were analyzed using the Net Promoter Score [10].

represents a total of 183 years of IT experience, but this number alone does not guarantee success.

Team members hail from diverse backgrounds from the sciences, law, business and fine arts. Hobbies include handbells, cycling, farming, auto mechanics, worm farming, cooking, music, and travel. This diversity means that the team comes at problems from different perspectives. This enables better questions and better results as the Liaisons collaborate on solving these problems.

There are several key personality traits that enable the Liaisons' success. Empathy is the gateway element to building relationships with researchers. It allows a connection with people first and uncovers a human story beyond the problem at hand. Curiosity prompts Liaisons to always ask, "What problem are you trying to solve?" Being comfortable with ambiguity is essential to finding the best solution for researchers. Self-direction drives new connections in directing researchers to the IT services they need.

By harnessing these traits, Liaisons are able to translate researchers' stories into technical requirements and create innovative solutions by partnering with IT colleagues across the University. Liaisons are the connective tissue between humans and technology.

3.3 How were relationships formed with researchers?

Most interactions with researchers start with a request for software or a computing system. However, what they ask for is often not what they need. Liaisons take a step back and ask the researchers "What is the research you are trying to do?" This changes the conversation from a transactional discussion to a discussion about the problem the researcher is trying to solve. It builds trust with the researchers by showing interest in their work and success. Ultimately, it also provides a better solution for the researcher.

At the same time, it also helps the Liaison become a better advocate for the researcher. By "telling the story" of why the researcher's work is important, a Liaison can motivate fellow IT professionals. It is easy for an IT professional to lose sight of their work's importance when the work is reduced to "I need a computer" or "My computer can't connect to the Internet." "I need a computer to help save lives in our community" is a much more powerful statement. It changes the work from being device-focused to being people-focused. For an organization that also provides IT service for a hospital, this is a difficult – but crucial – paradigm shift.

In the process of building understanding and relationships, the Liaisons and their IT colleagues are not just becoming professionally invested in helping the researcher, they become personally and emotionally invested in the research work succeeding. They understand why the work is important and that makes them a better partner in solving the technical problems the researcher needs to overcome in order for the research work to succeed. This relationship relies on honesty and transparency, as does any good relationship, so setting reasonable expectations and engaging in service recovery when expectations are not met is also critical.

One example relationship is with the Dr. Evan Snitkin lab in the Microbiology and Immunology department. The Snitkin lab has been doing bacterial genomics work for several years, which predates any of the best practices for genomics data that UM has established today. MM is on a different network from the rest of UM's campus, including the campus clusters needed for bioinformatics. This lab originally received storage on the MM network for their genomics data, which was the best option at the time. However, the genomics software (which is I/O bound) would saturate the MM firewall when computing directly off of the MM storage, causing some ire from the networking team. The Liaisons helped the lab modify their workflow to include a transfer step to scratch storage before any computation. Now that storage services are more robust, the Liaisons are helping the lab migrate out of the MM storage into proper tiers of ACI storage. During the process, the labs' data management is being cleaned up as well. This work will serve as a template for genomics workflows in the future.

Another example comes from a new faculty member in a Liaison department. The faculty member came to the Liaison team very frustrated with a low level of trust for HITS. Early engagements were fraught with his frustration and assignation of blame for the IT roadblocks. He had a microscope that generated large amounts of data and needed a specialized workflow for analysis which required a large amount of network attached local storage. The Liaisons engaged senior leadership, the networking team and the device team to provide him a non-standard and secure solution that supports his work. Along the way, the Liaisons learned about the pressure he was under to deliver results to meet tenure track milestones. They also learned he was a new father. Acknowledging these very human situations helped ameliorate a negative interaction and set frayed nerves at ease.

In both cases, treating the problem holistically and assuming best intentions led to success.

3.4 How were relationships formed with other HITS teams?

The Liaisons ended up forming beneficial relationships with numerous HITS teams as well. These relationships include enterprise storage, enterprise networking, information security, and the managed OS engineering teams. The Liaisons even brought about a new collaborative team to govern and support the addition of new device types (such as scientific instruments) to the network. One thing that was essential for all of these relationships was holding efficient meetings. Conducting meetings is a skill as much as anything else, which many people take for granted. When working initially with these teams, meetings were given careful attention. All meetings had an agenda that was sent out beforehand. The agenda always included a recap of the last meeting, the goals for the current meeting, and the action items for the next meeting. This made productive use of time that helped accelerate the work needed from these teams and engendered good will from the assistance.

The enterprise storage team was the first relationship formed. Their business structure was informed by the clinical enterprise, not the research enterprise. They extrapolated growth from historical data and planned storage increases in the yearly budget. They were limited to yearly funding increments. Leadership had decided to stop all recharge for HITS, so this storage was allocated with no cost to the labs. As can be predicted, this led to a shortage of space with no budget to buy more disk. This continued through multiple budget cycles and researchers were complaining loudly. Erin precipitated the first meeting with the storage team to solve this problem. Working together, the teams were able to change the funding model to account for the bursty nature of research requests and help develop a standard process. Today, the teams have a well-oiled collaboration that efficiently gets researchers to the solution they need. Dave Crippen, a member of the storage team, comments on the collaboration:

> "The Academic Engagement team aims to help us ensure a more positive experience for our research focused customers."

The networking team was the next relationship. Researchers working with large datasets or generating large amounts of data were exceeding the campus standard of 1Gb Ethernet. Requests to get faster connectivity were routinely denied, irrespective of funding. Research IT worked to document the need: over a dozen devices on site or being procured that produced data exponentially larger than previous devices. Light sheet microscopy, CyroEM, and other technologies were potentially going to double the storage needed for MM. Moving this data from the devices to ACI would prove challenging with the current infrastructure. While research dollars could be appropriated for network changes, the planning and funding for backbone support of these changes was planned years in advance rather than months like researchers required. Using the collected data, Research IT worked with the networking team to develop a more proactive process to address networking changes for research. This led to a service for greater endpoint device speeds to the intermediate distribution frame and faster network paths from the devices to ACI.

Over the past two years, several customers came to us for help with projects that needed Information Assurance (IA) security reviews. The Liaisons recognized that the review process was opaque, inwardly facing to IA, used specialized terminology that was hard to understand, and was reactive. This surfaced in IA remediation requests to customers to amend grant-funded projects after their grant money was exhausted. The Liaisons partnered with IA and were able to provide valuable feedback on how their processes were affecting customers. IA assigned one of their analysts to work directly with the Liaison team as they iterated and improved their processes. This proactive partnership has led to face-to-face meetings with customers, the development of a consultative approach where customers can "do the right thing" before they build their project and a greater understanding of the IA review process.

MM computers were centrally managed with a single core image to improve security and management across the network. However, this management often conflicted with the research goals on workstations. Limited permissions, forced rebooting, energy management, as well as lack of agency of the control of the device in a research study. To serve researchers better, a group of faculty members was assembled to provide feedback and the OS engineering team implemented changes to make the core image perform better for researchers. Where devices needed to be run for longer durations without reboot or where timing around upgrades needed to be controlled, a separate version of the image called FLEX was developed. Along with customizations in the active directory policies, management of patching would be put in the researchers' control. If they did not patch according to the agreed upon schedule, the devices would be removed from the network, rather than pushing patches that might interrupt the study.

Michigan Medicine moved to network access control (NAC) to help mitigate unknown devices connecting to the network and to provide 98% of devices in an inventory. Before each device can connect to the network, it must be accepted by a service provider and inventoried. This change created confusion and consternation in the research areas due to the varied amounts of current devices, as well as the innovative new devices being employed to assist the research mission. The Liaison team started working with customers, connecting them with service providers and helping them get them onboarded. For new devices or devices that did not have a clear categorization or service provider, a new workflow was developed to gather the required information on the device and have it reviewed by the Unique Device Equipment Workgroup (UDEW). With this workflow, research devices gained access to the network quickly and securely. IA, networking team members, and device category chairs attend a biweekly meeting to streamline the approval process. Data quality for onboarding improved, and the time to approval went from months to weeks. More importantly, the Liaisons could consult and seek pre-approval before devices were purchased to ensure devices could be networked before money was spent.

All of these teams had standard processes that didn't accommodate research. Research IT stepped in to collaborate with the teams to help change their processes and alleviate some of the pressure from research requests. Often, there was a significant change to financial and budgetary processes. Research IT joined the teams in advocating for the financial changes. Because the Liaison team doesn't have any infrastructure of their own to manage, they have more time to assist other teams that are struggling with their own management.

3.5 How were relationships formed with other service providers?

Some relationships with other service providers were formed out of necessity. For example, ARC's support model relies heavily on the different College IT departments. Before Erin restructured the Research IT teams, there were a few designated staff that collaborated with ARC and fulfilled tickets in ARC's ticketing system. With Erin's restructuring, these staff were formed into a separate Academic Computing team that only dealt with ACI. The Liaisons then layered on top of the Academic Computing team to help provide more contextual support. Jim Kenyon, the Academic Computing lead, has this to say:

> "The Liaisons are force multipliers. Our team doesn't have enough cycles to vet use cases for HPC and Cloud. The Liaisons help front end these requests for us."

This relationship was put to use while forming another relationship with the Biomedical Research Core Facilities (BRCF). This group consists of ten bioscience focused Core Facilities, each with varying amounts of information technology infrastructure and varying compute and storage needs. Two of the Cores in particular, the Advanced Genomics Core (AGC) and the Bioinformatics Core (BFX), have seen their storage and compute needs grow exponentially with the increase in popularity of next-generation genomics techniques such as single cell sequencing and spatial transcriptomics. When the Liaisons began their engagement, the Cores were using local compute and storage resources, which were becoming outstripped due to increasing demand. Working closely with the Core's bioinformaticists, Academic Computing, and ARC, the Liaisons were able to craft a migration strategy to help the Cores transition from local IT resources to cluster resources, decreasing the turnaround time of their bioinformatics work and better managing the terabytes of analysis data their next-generation sequencing work produces.

Other relationships are formed by noticing patterns in requests. One clinical research center was submitting many Incidents in the HITS ticketing system. The Liaisons noticed all of the tickets and realized that they seemed to be about the same issue. They reached out to the submitter and suggested a meeting to discuss their larger issue and guide the work in a more cohesive way. This center had complex infrastructure using obscure technology. The developers supporting it had left the university and the center didn't even know enough about the technology to guide hiring new developers. The Liaisons were able to help wrangle their infrastructure in the short-term and guided their work long-term once they had a new developer. This center manages patient datasets for clinical research as well as developing complex analytics to improve patient care. Their work involves cutting edge machine learning as well as complex security requirements. The Liaisons have smoothed out the process of consuming HITS services and streamlined security reviews, leading to more efficient work from the center.

With outside service providers, the common thread is finding the large, complex issues that could never be solved through individual IT requests alone. The Liaisons help streamline process to make outcomes better for the providers' research customers.

4 LOOKING TO THE FUTURE

With the success of the pilot, Academic Engagement has started a project to expand the Research Liaison team. The end goal of the program is to expand to all 30 research departments in MM. In addition, the Research IT teams have merged with the Education IT teams to become Academic IT. Academic Engagement will also need to develop an Education Liaison program in the future.

One incremental FTE has been approved so far and the Liaison team hired Lovida Roach in February 2021. She is already making a positive impact and brings significant curiosity to the role. Fortuitously, her onboarding happened during the preparation of

this manuscript. This allowed the team to enhance the onboarding process in ways that weren't considered, prompting the team to consider how to refine the process for the next hire. Here is her testimonial:

> "The Academic Engagement new employee onboarding process was very welcoming, organized and engaging. I immediately felt like a true team member from the beginning of my first team meeting. My manager provided orientation not only related to the responsibilities of my immediate team, but those that affect the entire Academic IT organization. Another welcoming piece of my orientation was a scheduled one-on-one with the Academic IT Senior Director, who presented me as a new employee to all Academic IT staff during my first all staff meeting.
>
> For continued guidance and conversations, my manager and I have weekly scheduled meetings. He has also assigned a team member to mentor me and provide support for my learning experience and any training needs that may arise. One of the things that I find to be of great value is shadowing other Liaisons in their engagement meetings. This is reinforced by reading through unresolved tickets to see how the requests originated and the workflow process to see how we're addressing and resolving their problem. The team has allowed me to move at the pace that I feel most comfortable with and at any stage of the process, if I need further explanation of a term or procedure, they are willing to pause and make sure I have a complete understanding. I feel very blessed to be part of a team that is genuinely concerned about my success."

The expansion project target for new hires is four more over the next 12 months, after which the team will re-evaluate where the remaining gaps are, if any. Today there are over 30 departments that may require a named Liaison team member and the team currently supports 11. By the time of this manuscript's publication, the Liaison team expects to have added four departments.

In addition, the Liaison team plans to enhance HITS effectiveness by

- improving content in the HITS knowledge base
- improving relationships with three more HITS teams
- continuing to strengthen relationships with HITS service providers

They also plan to enhance the process for prospectively seeking out gaps in IT support and establish a process for advancing proposals that address these service gaps.

ACRONYMS

ACI: advanced cyber infrastructure

ACI-REF: Advanced Cyberinfrastructure – Research and Education Facilitators

AGC: Advanced Genomics Core

ARC: Advanced Research Computing

BFX: Bioinformatics Core

BRCF: Biomedical Research Core Facilities

HITS: Health Information & Technology Services

IA: Information Assurance

ITS: Information & Technology Services

MM: Michigan Medicine

NAC: Network Access Control

NPS: Net Promoter Score

UDEW: Unique Device Equipment Workgroup

UM: University of Michigan

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