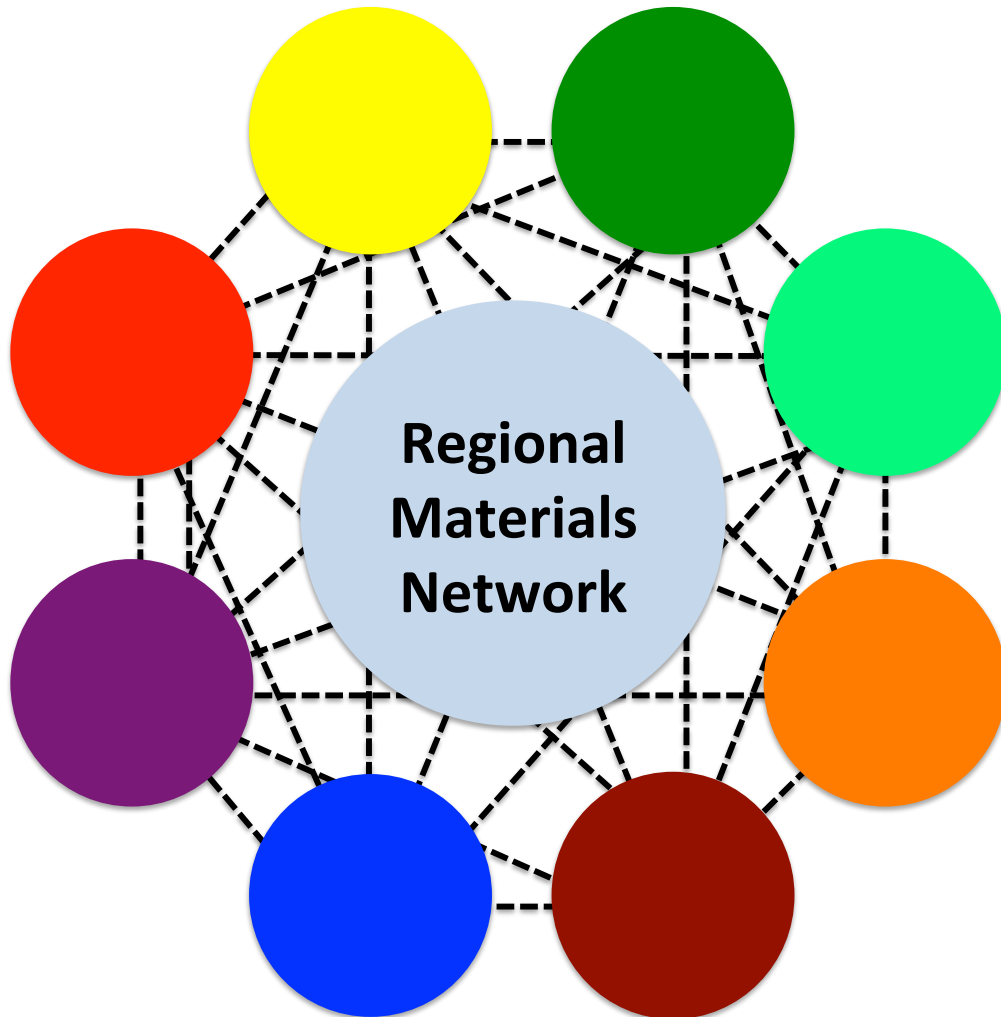


Report on Workshop on Developing a Regional Materials Network



Workshop Details

December 9, 2013, 9:00am-2:00pm

University of Wisconsin - Madison Engineering Campus

Tong Auditorium, Engineering Centers Building, 1550 Engineering Drive

Report Authors

Dane Morgan (ddmorgan@wisc.edu), Tom Kuech (kuech@engr.wisc.edu), Phil O'Leary (oleary@engr.wisc.edu), Jon McCarthy (jjmccarthy@wisc.edu)

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1 Overview

This is a report on the results of the *Workshop on Developing a Regional Materials Network* (RMN) held at UW-Madison on December 9th, 2013. This workshop was to help interested parties learn more about each other's resources and needs and formulate a roadmap for establishing the RMN. The goal of the RMN is to help increase opportunity and efficiency for materials scientists in Wisconsin and beyond.

The workshop had 53 registered attendees, with registered participants from a range of UW system schools (e.g., UW-Madison, UW-Stout, UW-Platteville, UW-Milwaukee), companies, and institutions (e.g., the USDA Forest Products Laboratory). Invitations were sent out to potentially interested participants in a number of other Wisconsin academic and business institutions, but many could not attend for one reason or another. Furthermore, due to limited time and resources, many potentially valuable participants were likely not contacted. We would like to be clear that nobody was intentionally excluded and we apologize if anyone felt they were not properly informed about this event. ***We hope that everyone will freely share this report and an open invitation to participate in developing the RMN going forward.***

2 Meeting Agenda

Here we summarize the agenda to illustrate how the day was allocated.

9:00 am

Welcome address, Dean Ian Robertson, College of Engineering

9:15 am

A vision for the region's materials network and the goals of the meeting
Thomas Kuech, Chemical and Biological Engineering
Dane Morgan, Materials Science and Engineering

9:45 am

Presentations from groups regarding their resources and needs for equipment and simulation

10:45 am

Break

11:00 am

Breakout discussion groups on:

- What is roadmap for establishing a network of facilities?
- What is roadmap for establishing a network of simulation/data?
- What is roadmap for establishing a network for education?
- What is roadmap for connection to industry?

12:00 pm

Working lunch. Report from each breakout group with discussion.

1:30-2:00 pm

Final open discussion and wrap-up

3 Presentations

An initial set of short presentations from participants provided information on a number of resources and needs. These presenters included

1. Douglas Dunham - UW Eau Claire
2. Seth King - UW La Crosse
3. Yan Wu - UW Platteville
4. Jon McCarthy - UW Madison
5. Laura Schmidli - UW Madison Libraries
6. Sam Zelinka - Forest Products Lab
7. Thomas Primiano - NanoOncology
8. Wei Zheng – UW Stout

Some important ideas that emerged from these presentations included

1. WI institutions have equipment to share that is being underutilized.
2. WI institutions have equipment needs that could be met by sharing among institutions.
3. Equipment lists not clearly accessible and it is challenging to find and access needed resources outside one's regular work environment and institution.
4. Resources for numerical simulation are needed.
5. There are other groups (e.g., UW library) offering free services to the UW system and general public around core instruments for data, research, etc. that might support activities across WI.
6. There are faculty looking for students due to limited access to graduate students.

4 Breakout Sessions

Breakout sessions were convened to discuss issues in the RMN relating to

1. Facilities (lead – Tom Kuech, UW Madison)
2. Simulation/Data (lead – Dane Morgan, UW Madison)
3. Education (lead – Phil O'Leary, UW Madison)
4. Industry (lead- Jon McCarthy, UW Madison)

Each group was guided by the following 5 questions:

1. What do we need?
2. What would be most beneficial?
3. What would a network look like?
4. What can we do now?
5. What is a high priority?

After the breakout sessions the entire group reconvened and breakout sessions representatives reported on ideas from each group. A summary of ideas from each group is below.

4.1 Facilities Breakout Session

The following key points emerged from the facilities discussion:

1. We need staff for facilities. Staff is, in many ways, more important than equipment to facilitate interaction.
2. Training could be done across campus via online tools and courses.
3. We need flexible fee structures, e.g., different costs for when you need tools quickly as opposed to when you can wait.
4. "Portals" at each participating site would enable access for network tools. Participants need a long-term interest in supporting that tool or the portals go dormant. Initial steps would be to establish a demonstration of such a portal.
5. Unique tools can fulfill a real system need within the region and access to those tools in particular would bring real value to all.
6. It would be valuable to establish a standard approach to interacting with industry that allows each member of the network to effectively offer the services of the whole network. This makes us all more effective as a team.

4.2 Simulation/Data Breakout Session

This group tried to break the problem down into a few areas, Data, Simulation/Analysis, Hardware, and general Cyber (and other) infrastructure.

1. Data
 - a. An almost automatic resource that allows all experimental and simulated data to be loaded to a secure online site would be very valuable. However, this database needs tools to help aggregate, analyze, and learn from each others data.
 - b. We could benefit from shared big data management activities, including being ready to potentially provide support for a broader federal data effort.
 - c. Allow RMN members to test against previous data, e.g., providing validation data sets for education and research.
2. Simulations/Analysis
 - a. There are many existing tools but inadequate expertise to assess to which to use and check if they are being used correctly and optimally. RMN could provide a network of experts to talk to and ask questions. Maybe a listserv, forum, etc. For example, sharing information about good educational or research tools on Nanohub, analysis software that is available, etc. The key points is that just sharing information on what is out there is of huge value.
 - b. Are there ways to share software across UW system, e.g., broader "site" licenses?
3. Hardware

- a. Computing time is limited for awards of non-R1 applications, which could make a regional cluster valuable. However, just more information on available national resources and pathways to collaborative proposals could meet many of these needs. It is possible that more communication could be as valuable as more hardware.
- 4. Cyber (and other) infrastructure
 - a. Cyberinfrastructure to support communication and collaboration would yield immense value.
 - i. Just a list of who does what would be a great start.
 - ii. Some kind of social network (e.g., liked LinkedIn) could be useful to provide ways to get to know each other, ways to ask questions, ways to plan proposals, etc.
 - b. Cyber or other infrastructure to help share expertise would be beneficial, e.g.,
 - i. Funds for 2 weeks of summer salary to bring in people to groups.
 - ii. Sabbatical support.
 - iii. Recorded lectures.
 - iv. Sharing group meetings through video.
 - c. Do we need dedicated data lines for fast data movement?

From these discussions the group proposed two areas they thought would benefit most from immediate attention:

1. Collect data on equipment and simulations and learn to organize it.
2. Enhance collaboration and communication through cyberinfrastructure. Try to organize by areas of expertise as such a group has natural synergies within it.

4.3 Education Breakout Session

1. Educators at many institutions are looking for easier access to expertise to help them develop material and educate.
2. Industry is in general looking for well-trained graduates more than educational programs for their employees and industry therefore wants to have input into the training of students.
3. Undergraduate programs and technical colleges are an essential group to involve in the network.
4. An easily accessible facility contact and centralized equipment list with availability, cost, access schedule, mechanism to sending samples would be extremely helpful for educators.
5. Summer programs for touring facilities and providing training for faculty statewide would be valuable.
6. Training modules on what equipment can do, why you need it, and how to use it remotely would be valuable.
7. Non-credit types of educational offerings that can be used by industry are effective. See Penn State as a successful example that does this well right now
8. We should find ways to share educational materials, particularly in specialized areas. For example,
 - a. It would be useful to have one institution that has courses in each specialized area that would be shared to all regional schools. One could provide

- online access. E.g., a course in simulations methods. We note that some language courses are done this way already.
- b. Same idea for lectures and other materials – it would be useful to put them online and create a portal. However, not just all lectures. There is particular value in local lectures from industry and academia that ties to workforce development. For example, a recruiting talk. Having a portal for this type of presentation could be helpful.
9. Many institutions need access to libraries and other information services.
 10. More contact should be made to the technical schools, e.g., the programs to train in operating SEMs, TEMs in Madison College. Chippewa Valley Technical College has a program in microelectronics which the RMN could connect to and help grow.

4.4 Industry Breakout Session

This group organized its responses along the lines of the 5 questions and the key points are summarized below.

1. What do we need?
 - a. Not just finding tools, but finding experts/resources is very valuable for industry. Industry does not really want just tools, they want answers.
 - b. Industry is looking for help from the RMN for finding new research/product opportunities and collaborators for specific high-impact (“killer”) applications.
 - c. A structure for feedback to regional institutions from industry is valuable to enhance communication and make sure regional educational institutions are providing the research and training that regional industry needs. This both helps industry and helps keep them engaged in local industry consortia to support academic collaborations.
 - d. We need to integrate regionally our resources to make them easier to find.
 - e. We need dedicated resources, particularly staffing, for meeting these industrial needs.
 - f. A regional conference might be useful to foster face-to-face interaction.
2. What would be most beneficial?
 - a. The single most beneficial thing right now would be to provide points of contact for interacting with the network.
3. What would a network look like?
 - a. This is not clear but one should consider related prototypes. For example, that being developed by Nanovox and activities in the UW-Madison Engineering and Professional Development Department.
4. What can we do now?
 - a. Establish staff to help meet the needs items above.
5. What is a high priority?
 - a. We must work out the “business model” for a successful, sustainable effort. This means establishing something where the resources and motivation for each group are clear. In particular, we should note that a unifying presence on the web is the face of the RMN, but not the structure.

Behind that face we need to establish the nodes of the network that represent real strengths in given regions and then support those 100% with funds, directing inquiries, etc. People need ownership of certain areas that they commit to and are proud of to make things work. One also needs representative governance from all participants to make a network people will support. Finally, the incentive for a given faculty or researcher to help must be clear. Such incentive will only come if this type of help is recognized in the merit review process somehow.

5 Summary Comments and Next Steps

This workshop provided a range of valuable outcomes. Of critical importance was that it provided a chance for many members of the regional community to meet and share ideas for the first time. Overall there was a strong enthusiasm to work together to develop a RMN. While many good ideas for goals were presented, a few appeared in multiple breakout sessions and were foremost in the open group discussions. ***In particular, there emerged the following two major interrelated goals, which will be the focus of the next steps.***

RMN Portal: Multiple groups encouraged establishing a portal to available resources. This portal would include experimental equipment, computational hardware, and software, as well as key contacts, availability, mechanisms for use, and costs. Such a portal would make it dramatically easier for academic researchers, educators, and industrial users to find and utilize what we already have in place. ***To support this goal WMI will initiate development of a RMN portal.***

Shared equipment with remote access: There was strong enthusiasm for establishing a practical mechanism for sharing equipment resources using remote access. Such an effort must address issues of staffing and long-term sustainability. As part of such an effort it was recommended that consideration be given to enhancing access during summer and break periods and exploring possible alternative fee structures to make equipment accessible and affordable across the UW system. ***To support this goal WMI will explore an initial program of remote access between two or more system schools to establish initial demonstrations of equipment access within a network.***

We are very excited that the RMN workshop has led to a pair of clear action items for helping initiate the RMN and we look forward to interacting with you in their implementation. Coupled with this is an open invitation to all interested institutions and entities to join in the development of the RMN. As these next steps are pursued we will be in touch on additional meetings and opportunities for sharing ideas and further development. More broadly, we hope that this first RMN meeting has initiated many new contacts and a new dialogue focused on helping us work together to be more than the sum of our parts.