



pro² Network+ Advisory Board Agenda and Minutes

8 April 2025, 2-3:30pm | Microsoft Teams

Attendees:

Tim Minshall, Dr John C Taylor Professor of Innovation and Head of the Institute for Manufacturing at the University of Cambridge, **Chair**.

Jim Davison, Region Director, Make UK.

Lars Erik Holmquist, Professor of Design and Innovation, Nottingham Trent University.

Maura Lydon, pro² Network+ Senior Administrator, **Secretary**.

Rory Clark, pro² Network+ Research Associate, University of Bristol.

Sarah Hughes, pro² Network+ Manager.

Steve Hodges, Professor in Computing and Digital Systems. pro² Network+ Steering Group Co-Lead.

Apologies:

Giulia Pratico, Western Gateway Team Manager, Innovate UK Business Growth.

Laura McDonnell, Senior Portfolio Manager, EPSRC.

Maria Galvez Trigo, Assistant Professor in the School of Computer Science and Informatics, Cardiff University.

Mike Fraser, Professor of Human-Computer Interaction and Head of Department of Computer Science, University of Bristol. pro² Network+ Steering Group Principal Investigator and Chair.

Sarah Fawcett, VP Operations, OKdo.

Stephen Chadwick, EVP & President EMEA, Hexagon Manufacturing Intelligence.

Agenda

Item	Title	Allocated Time	Lead
1	Welcome and review of actions from the last meeting: Actions: <ul style="list-style-type: none">ML to follow up with IQ regarding a photo for the website.AB members to provide guidance on how pro² might respond to the industrial strategy consultation.The pro² SG to develop a plan for gathering information that will feed into a response to the consultation.AB to provide further guidance, if any, on how the network can best stay in touch with summer school attendees and keep momentum from the event going.	2-2:20 31/10/24 8/11/24 A.S.A.P. 8/11/24	TM ML AB SG AB

	<ul style="list-style-type: none"> AB to read the Residency Scheme in detail and provide further commentary on its potential benefit to industry and avenues for marketing it. ML to provide a reminder of the above action. ML/SHu to explore the suggested avenues for disseminating the scheme. ML to book the next meeting in six months' time. 	8/11/24 20/11/24 1/11/24 29/11/24	AB ML ML / SHu ML
2	Update on what has been done since the last meeting and what is next for pro ² <ul style="list-style-type: none"> Theme One funding call Residency scheme update Summer school planning Event sponsorships and public engagement Away day Staffing updates 	2:20-3:10	SHo
3	Research Associate work programme overview	3:10-3:20	RC
4	Finance update	3:20-3:25	SHu
5	AOB	3:25-3:30	TM

Minutes

Item	Title	Deadline	Responsible
1	<p>Welcome and review of actions from the last meeting:</p> <p>Actions:</p> <ul style="list-style-type: none"> ML to follow up with IQ regarding a photo for the website. <ul style="list-style-type: none"> Complete. IQ has stepped down from her role on the AB due to a lack of adequate time to support the role. TM asked if recruitment was needed for a new member to replace IQ. SHu said there was no requirement for a particular number of AB members, so the network is not currently planning on recruiting a replacement. AB members to provide guidance on how pro² might respond to the industrial strategy consultation. 		

	<ul style="list-style-type: none">○ Complete. JD said many thousands of responses had been received and the government is currently reviewing them. Organisations like Make UK are keeping pressure on the government to respond quickly and positively, as well as continuing ongoing discussions. They are hoping for a positive announcement of a new industrial strategy in the future. SHo asked whether it was possible the strategy response might be 'watered down' in some way. JD said his primary concern is that the response may be spread too thinly or interpreted too broadly, as the government is taking a broad definition of industry. For now, Make UK is continuing to place pressure on the government and ensure they identify key future sectors. In particular, JD believed that advanced manufacturing and engineering needs to be inclusive of processes as well as industries like clean technology. SHo asked if the quantity of responses was part of the problem. JD did not believe that was the case, instead he felt that the high number of responses reflected the importance of the topic. He noted that key threads from the responses were being identified and understood by the government, however there will be limited funds available to support a strong response to the strategy. Despite this, he hopes the government will aim for the best outcome possible under the circumstances. TM said there may be an opportunity at present given the current situation in the US, noting that with relatively low		
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	<p>US tariffs on the UK it may be an attractive place for industry. He hoped this would increase the importance of making products in the UK, especially as there has also been low spending on defence. JD agreed, stating that in terms of security there are amplified concerns due to the conflict in Ukraine and it is less attractive now to lease defence technology and equipment from the US given the current period of uncertainty. This places greater importance on UK manufacturing as well as critical areas like food and energy security. Altogether TM felt this represented a good opportunity to foster domestic production.</p> <ul style="list-style-type: none"> • The pro² SG to develop a plan for gathering information that will feed into a response to the consultation. <ul style="list-style-type: none"> ○ Complete. • AB to provide further guidance, if any, on how the network can best stay in touch with summer school attendees and keep momentum from the event going. <ul style="list-style-type: none"> ○ Complete. • AB to read the Residency Scheme in detail and provide further commentary on its potential benefit to industry and avenues for marketing it. <ul style="list-style-type: none"> ○ Complete. • ML to provide a reminder of the above action. <ul style="list-style-type: none"> ○ Complete. • ML/SHu to explore the suggested avenues for disseminating the scheme. <ul style="list-style-type: none"> ○ Complete. • ML to book the next meeting in six months' time. <ul style="list-style-type: none"> ○ Complete. 		
2	<p>Update on what has been done since the last meeting and what is next for pro²</p> <ul style="list-style-type: none"> • Theme One funding call 		

	<p>SHo said that one of the network's main mechanisms for distributing funding and generating impact is through funding projects in UK universities. Three rounds of funding have now been completed, one of which took place since the last AB meeting. The network's activities are organised into three themes and each of the three calls completed corresponded to one of them.</p> <p>The most recent call related to Theme One, with a focus on novel materials and/or novel uses of materials in emerging technology and devices. A total of 23 applications were received representing 27 different organisations. Applications were anonymously reviewed by three independent reviewers each, resulting in twelve which were shortlisted for interview by the SG and ultimately three of these were funded. Two are based at Birmingham, the first led by Hyunyoung Kim (project entitled 'Laser-Induced Forward Transfer of Graphene for Interactive Devices') and the second by Yi Wang ('Liquid in Circuits'), and one at UCL led by Ben Oldfrey ('Device Scale Direct Composite Functional Elastomer Printing'). The two at Birmingham came from different departments internally and are unrelated to one another. The three projects are funded at about £100,000 each, with 80% full Economic Cost covered by pro². SHo said that it was great to see as many as twenty three proposals, with twelve of these represented at the interview stage by individuals who were truly excited by the opportunity to engage with pro². He felt that the interviews were a great opportunity to learn what some of the best people in the field are working on, as well as a good mechanism to create space for conversations around the proposals. In choosing which to fund, the SG have strived to create a diversity of projects working in different areas. The hope is also to establish longer-term relationships with these project leads, which funding projects allows for (an added benefit in addition to funding the actual research itself). He noted that the pro² team visit projects at their institution to make videos about the work, which helps to build relationships and develop more outputs to share with the wider community.</p>		
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	<p>Comments: TM said it was great to see the breadth of applications and diversity of institutions represented. He recognised that it was natural that the first funding call organised by the network included many proposals from SG institutions, as the team was still working to get the word out at that stage, but the recent call shows great reach to new applicants. LEH said the funded projects seemed very interesting and that it was nice to see innovative but applied work proposed.</p> <ul style="list-style-type: none">• Residency scheme update <p>SHo said the network has set aside £75,000 for residencies to be funded under the pro² Residency Scheme over the remaining years of the network's grant. A formal mechanism has been established for individuals to apply for either £5,000 or £10,000 depending on the type of residency, with funds distributed only to UKRI eligible institutions. These can support individuals going from the UK to an overseas destination or from overseas to the UK. Two residencies have been funded thus far, the first led by Eiman Kanjo which was broken into two parts as the SG decided to only fund the first part of the proposal for now. The proposed workshop being funded by the residency will take place in May 2025, and the project's outcomes will be reported afterward. The second successful application was made by Oliver Child in order to attend an event in Shenzhen, China and study the local manufacturing ecosystem. This residency has been completed and Oliver has written a blog post about the experience which was published on the pro² website and social media channels. SHo said the SG were aiming to spend the rest of the funds set aside for residencies within the next two and a half years. He noted they were still thinking about how to use this scheme to foster engagement between the SG and funding recipients, to achieve additional value by building relationships with them.</p> <p>Comments/Actions:</p> <p>TM noted that there was a previous action to consider how to further promote the scheme and asked whether it had achieved its full reach yet in terms of dissemination. SHo said there was still room for further work on disseminating</p>		
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	<p>the scheme. He recognised that the network has only spent about £15,000 so far and would like to receive a diverse range of applications in order to ensure that excellent projects are funded. At the last meeting, the AB provided suggestions around how best to promote the scheme. SHo stated that the pro² team tried to follow up on these suggestions with mixed success. For example, the team attempted to advertise on the Element14 website but had trouble making contact; however, the team now has a contact at Element14 and will follow up on this. The team also tried to advertise on the RS Design Forum but the post was removed as it was not considered aligned with the forum's usual content. The team intends to reach out to SF about this issue. Another avenue the team had trouble accessing was Sketching in Hardware, and would still like to disseminate there via the mailing list. LEH said he is a member of the mailing list and could distribute an email if the team forwards it to him; he can also disseminate via the CHI-announcements mailing list. He could also advertise the summer school on this mailing list if desired. Other avenues where the team successfully advertised the scheme included on the Women in Tech Hub, the SW HCI Discord group, Konfer, and the network's social media channels. TM suggested contacting The Shoestring Project, in particular he recommended that the SG reach out to the project's new lead, Mike Jones.</p> <p>Actions:</p> <ul style="list-style-type: none"> • AB to share any other ideas for promotion of the Residency Scheme, ideally for avenues where they would be likely to see and pay attention to an advertisement like this. • pro² team to forward an email promoting the scheme to LEH for dissemination via the Sketching in Hardware and CHI-announcement mailing lists. • SG to make contact with Mike Jones of the Shoestring Project • Summer school planning <p>Last year the network organised a summer school at Lancaster University which took place over three days. A similar event is being</p>	<p>30/5/25</p> <p>5/5/25</p> <p>30/5/25</p>	<p>AB</p> <p>pro² Management Team</p> <p>SG</p>
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	<p>organised this year which will take place from the 15th to the 18th of July with subsidised places for about thirty people, aimed at a diverse audience. Last year's applicants needed to submit a paper about a device they have built or would like to build. The SG felt the event was successful, as they were able to fill all thirty spaces plus room for a few extra attendees from Lancaster that did not require accommodation. The summer school organising team are currently working on the agenda, with the hope of attracting some returnees from last year's summer school to further build on this community. This year the event will last three and a half days, with some repeated content on the first day and new content on the final three days. In terms of demographics, last year there was a mix of graduate and undergraduate students, as well as makers, SME owners, and academics. Prizes were awarded (three awards worth £1,000 and five worth £200) and the Theme Two leads kept in touch with prize winners to check their device progress and give advice. In some cases, this has led to research collaboration between the network and the prize winners. A WhatsApp group was established last year for event logistics which the network has since made available to the wider pro² community, as an online space for networking and knowledge-sharing. The pro² team are in the process of advertising the 2025 summer school now, with registration to open soon. The network would greatly appreciate any support with promoting the event from the AB. SHo noted that last year the team accepted everyone who applied, using the submitted papers as part of the decision to award prizes. This year the team is aiming to be oversubscribed in order to choose from among the best applicants and foster a diverse group attendees.</p> <p>Comments: TM noted that the demographic targeted for the summer school is different from that of the residency scheme, and asked whether this was positive or whether pro² is aiming for greater diversity of summer school applicants this year. SHo said it was positive to reach many early career researchers and students last year, representing a less represented group among the network</p>		
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	<p>membership. He said the team is aiming this year for even more applicants, but they were happy with the diversity of last year's applicants. TM wondered if the network could aim to reach more SMEs and companies, who might send people like students or apprentices to the summer school. This could be attractive to companies as something they can offer to reward their apprentices in the form of professional development and training. SHo said there's an ElecTech Cluster, made up of tens of companies involved in electronics manufacturing, some of which are connected with defence and the lighting/LED industry. They recently held their first annual meeting which SHo attended, and they have started organising their own events to train staff in order to develop a better pool of candidates to hire from. There could be an opportunity to connect with this community for summer school recruitment. SHo said that while the ElecTech Cluster is local to the Lancaster area, it would be worthwhile to seek similar communities to advertise with elsewhere.</p> <p>SHo asked how applications should be prioritised if a large number are received. Last year when deciding to award prizes, the team selected for potential for impact in terms of which prototypes seemed viable, had an existing or potential market, good plans for scaling, and so on. He asked whether a similar metric should be used to assess applicants for places at this year's summer school or whether it would be better to consider factors like prioritising diversity or local companies. TM asked whether there was anything in the initial proposal that would constrain decisions about this. SHo said he was unsure and would need to look into this. He felt that there probably was not, as the summer school's mission is to educate people around challenges in isotyping and developing prototypes for production. JD said they'd done events matching original equipment manufacturers (OEMs) with start-ups linked to Innovate UK, and wondered if those could help segment potential applicants by industry. He noted that Innovate UK has a good pool of companies pioneering new technology and that start-ups are keen to showcase their technology to organisations they</p>		
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	<p>have trouble connecting with. JD said they had received OEM input on who they are seeking as partners, so that Innovate UK could help identify companies by industry/technology; for example by clean technology, automotive, etc. The team JD has worked with could do something similar for pro², the network would just need to be clear about what it's looking for.</p> <p>Actions:</p> <ul style="list-style-type: none"> • AB to assist with the promotion of the summer school by sharing it with their contacts and advising the network on good avenues for advertising. • SHo to connect with the ElecTech cluster about promoting the summer school. • JD to establish an introduction between the team he worked with to identify companies by industry and SHu and ML, CCing SHo. • TM has sent an email to his own contacts at Cambridge about the summer school and will forward it to others as well. The pro² team can check in with TM about the response to this. • Event sponsorships and public engagement <p>The network is seeking to broaden its membership base by engaging with makers, hobbyists, students, and SMEs through sponsoring and attending events like the Open Hardware Summit and the SW UK Pre-CHI. The network will staff tables at these events to share information about pro² and raise awareness of the challenges around isotyping. The SW UK Pre-CHI event is related to the CHI conference, a large-scale international conference on Human Computer Interaction taking place this year in Japan at the end of April. Pre-CHI supports people with presentation skills and networking ahead of CHI. RC will hold an interactive 2-hour workshop around the pro² message and do some mapping of challenges and solutions related to making devices (more details on this in agenda item three).</p> <p>Comments: In terms of further public engagement opportunities, TM recommended</p>	<p>5/5/25</p> <p>A.S.A.P.</p> <p>5/5/25</p> <p>5/5/25</p>	<p>AB</p> <p>SHo</p> <p>JD</p> <p>TM</p>
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	<p>Smart Manufacturing Week, the second day of which focusses on outreach and engagement. He noted that it is free to attend but expensive to have a demo table; however, it could be worth members of the SG attending as a way of having a presence there. TM said his organisation often sends individuals just for the purpose of informally networking. JD agreed, saying that he had attended it twice and that the event is supported by Make UK. He added that some good speakers from his organisation will attend. The event will take place on the 4th and 5th of June at the National Exhibition Centre. SHo suggested raising that at the next SG meeting.</p> <p>Actions:</p> <ul style="list-style-type: none"> • SG availability to attend the Smart Manufacturing Week event to be discussed at the next SG meeting. • Away day <p>The SG held its first in-person away day last month, which provided a chance for the SG to focus on pro²'s mission for the future. SHo explained that one future activity the network is considering supporting is a project to make a software application called BOMnado open source. He said the application was invented by John Hardy who spoke at the pro² launch and the 2024 summer school. John is very engaged with pro² as his company, H&E Inventions, make low-volume bespoke industrial projects. To manage the devices they build, John developed his own software tool BOMnado (a Bill of Materials (BOM) management system). There has been a lot of demand for this tool to be made publicly available, as there is difficulty managing BOM for people making devices and not many free or open source tools. John sees BOMnado as a byproduct of meeting his own needs and has no plans to commercialise, which is why he is now willing to make it open source. The network has looked into developing it and believe this will have good, lasting impact for the community. The plan for developing it involves hiring an engineer through a SG institution, who will be semi-embedded with H&E Inventions and will work with them to make it open source. The engineer will also work with RC to find two or three companies</p>	29/4/25	SG
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	<p>that can test out BOMnado in order to determine how to scale it.</p> <p>SHo shared that the network has also been taking action to engage more with members. RC has been speaking with them about their challenges and has received a very positive response so far, reporting that many members are excited to engage with the network. RC plans to arrange an industry event to scale these conversations, in order to allow members of industry to network, seek collaborators, and find commons solutions to challenges. This event will also provide an opportunity to identify companies to participate in BOMnado testing.</p> <p>The SG will have another away day this autumn with a focus on writing bids for follow-on funding to support the continuation of the pro² network. SHo explained that the SG is conscious that the midpoint of network's five year grant is quickly approaching. They are therefore thinking now about follow-on funding opportunities, which could be in the form of another large grant to support the SG to continue similar work, or the funding could support spinoffs of other research proposals which might be led by SG members or others in the pro² community. During the Away Day, the SG reviewed the network's theory of change, which is meant to be a living document that evolves as the mission does over time. It has been updated following this discussion, including changes to activities the network had planned to do – e.g. a mapping of challenges which has now been replaced with a new activity around education that is being achieved through the summer schools.</p> <p>Comments: TM said that BOMnado is a very interesting project which aligns well with the pro² mission. He felt that supporting it was a good use of resources.</p> <ul style="list-style-type: none">• Staffing updates <p>SHo shared that Lorraine Underwood is filling in for Joe Finney who is currently on sabbatical. Lorraine is based at Lancaster University and has just successfully defended her PHD. He also said that since the last AB meeting, the network</p>		
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	<p>has hired RC as a Research Associate and that ML has been regraded to a new role as Project Coordinator, reflecting work at a higher level than originally planned.</p> <p>Comments: TM welcomed RC and Lorraine, and offered congratulations to ML.</p>		
3	<p>Research Associate work programme overview</p> <p>RC started as a Research Associate for pro² in January, and has since been integrated into ongoing work as well as identifying future work to be carried out. He has already reached out to many of the network's industry members to discuss their challenges and solutions, with a decision to focus on them rather than academic members at this point. He has received a very positive response, reporting that many people from industry are seeking to offer solutions to others and not just looking for answers to their own challenges. Many people expressed interest in attending an event, so pro² is aiming to organise one as an opportunity for networking. RC is also planning to hold a workshop at the SW UK Pre-CHI event with a focus on isotyping as well as mapping challenges and solutions related to producing digital devices. Both of these events are intended as research and mapping opportunities, as they present a chance to get people in the room who may be able to solve one another's problems, share ideas, and collaborate. RC is also looking into why people cannot simply find solutions to challenges online.</p> <p>In addition, he is working on a case study with John Vidler at Lancaster University around the design of the Access:bit, an accessibility add-on for the Micro:bit. As part of this project, they are asking people to order the Access:bit as a way of finding out why the ordering process is inaccessible to new users and how it can be improved. This work blends a person-centred approach with a review of existing literature, which they hope will result in some publications.</p> <p>Comments: TM said it is great to speak directly to companies and liked that RC is aiming to blend top-down and bottom-up approaches. He</p>		

	<p>wondered if RC's work might overlap with that of colleagues at Cambridge, Nottingham, and Sheffield who lead the Manufacturing on a Shoestring project. SHo responded to say that this was the case, as pro² is aware of their work and that he had suggested RC take a similar approach to his research. SHo expressed an interest in linking in with Duncan McFarlane of the Manufacturing on a Shoestring project, given that Duncan's work closely relates with what RC is doing. RC said that currently he has been primarily meeting with people nearby in Bristol, but will reach out to the Shoestring team in the future as well. TM said their early research is very similar to the work RC is doing now. SHo agreed with this and pointed out that BOMnado is an opportunity for supporting work similar to what the Shoestring project has achieved.</p> <p>Actions:</p> <ul style="list-style-type: none"> • SHo and/or RC to connect with members of the Manufacturing on a Shoestring project to discuss their closely related research interests. 	SHo / RC	30/5/25
4	<p>Finance update</p> <p>SHu reported that there is now about £170,000 remaining in the Directly Incurred portion of the network's budget. This accounts for summer schools until end of the grant, residencies, and additional staffing costs. She explained that there is a 'flexible funding pot' which represents the 'plus' in the 'network plus', as it provides the basis for pro² to fund most of its subaward projects. This has £30,000 left, however £120,000 from this budget has been committed to the new DICE network+ for a joint call. She said that pro² had supported the proposal for DICE because their work aligns with the sustainability thread that runs through all of the pro² themes. The new network is in the process of establishing itself and has only a three year grant to carry out its activities. They have a launch event coming up soon which SHu and MF will attend. After that event, SHu felt she will have a better idea of how much funding to provide for a joint call, which may free up some additional funds for other pro² activities. In total, the network has about £200,000 left for</p>		

	<p>future projects like BOMnado and industry-focussed engagement activities.</p> <p>Comments: TM said it was great to see a transparent and clear explanation of the network's finances. SHu asked if there were any concerns or questions about the planned activities. JD said the plans for future activities looked great and the network seemed to be on track with regard to its budget.</p> <p>SHo said that originally there had been some ideas related to activities around sustainability, which have since become less of a priority. He felt unsure about what this means in the context of the network, as he said he likes to think that the mission may reduce electronic waste but there is also the risk of increasing it. There are no sustainability experts among the SG members, which was part of the motivation to connect with DICE on a joint call, as a way to draw in the sustainability thread. SHo asked for any comments on sustainability concerns. LEH said he wrote an alt.chi paper a few years ago, which included a literature review on tangible interfaces and sustainability; at the time he could find almost nothing on the topic, but his paper has been referenced many times since, showing the growing importance of the topic. Making devices consumes resources and produces waste; LEH said that he had previously attended some workshops focussed on these issues. He recommended the network identify who is researching these problems and whether they might align with the pro2 mission. TM agreed that this would be a good starting point, and said it would also be great to see a paper in the future about pro2's thoughts on this topic, including why we did or did not carry out activities around it.</p> <p>Actions:</p> <ul style="list-style-type: none"> SG and/or RC to identify researchers working on the issues of sustainability and e-waste, and determine whether their work aligns with that of the network. This could serve as a starting point for future collaboration or as a resource for feedback on sustainability questions. 	<p>1/10/25</p> <p>1/10/25</p>	<p>SG / RC</p> <p>SG</p>
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	<ul style="list-style-type: none">SG to consider preparing a statement in future explaining why they did or did not carry out activities around environmental sustainability.		
5	<p>AOB</p> <p>To meet again in 6 months' time.</p> <p>Actions:</p> <ul style="list-style-type: none">ML to schedule the next meeting of the AB.	1/9/25	ML