



pro² Network+ Advisory Board Meeting

Friday 22nd May, 11am to 3pm

Room 0.3, Merchant Venturer's Building, Woodland Road, Bristol, BS8 1UB

Attendees:

Chris Snider (Funded project presenter)
Jim Davison (AB member)
Lars Erik Holmquist (AB member and funded project presenter)
Maria Galvez Trigo (AB member)
Maura Lydon (pro² Network+ Coordinator)
Mike Fraser (pro² Network+ Co-Lead)
Ollie Hanton (Funded project presenter)
Rory Clark (pro² Network+ Research Associate)
Sarah Hughes (pro² Network+ Manager)
Steve Hodges (pro² Network+ Co-Lead)
Tim Minshall (AB member and Chair)

Apologies:

Giulia Practico
Laura McDonnell
Sarah Fawcett
Stephen Chadwick

Agenda

Time	Agenda Item	Speaker/Chair
11.00-12.00	Review of actions from previous meeting and pro ² Network+ activities update	Mike/Steve/Tim
12.00-12.30	Funded project demonstration: Active Material Library	Ollie Hanton
12.30-2.00	Lunch	
2.00-2.30	Funded project demonstration: Multi-modal XR prototypes	Chris Snider
2.30-3.00	Funded project demonstration: Conversational Prototyping	Lars Erik Holmquist

Minutes

Time	Agenda Item	Speaker/Chair
11.00-12.00	Review of actions from previous meeting and pro ² Network+ activities update	Mike/Steve/Tim

	Previous Actions: • TM to connect his colleague with Yi Wang. ○ On further information, it was determined that their research interests were not as well aligned as first thought, so this was not actioned. • SHu to further discuss with GP the possibility of pro² developing a profile on the Enterprise Europe Network. ○ Completed. GP advised that Innovate UK no longer has access to the Enterprise Europe Network, so she advised using the website Konfer instead for advertising network activities like the Residency Scheme. • ML to establish a LinkedIn Group for summer school attendees. ○ Completed. A LinkedIn Group was established for anyone interested in low-volume device production, including summer school attendees, network members, and the general public. • AB members to share any further recommendations of channels for promoting the Residency Scheme. ○ Complete. pro² Network+ activities update Project updates: Mike gave an update on funded projects, excluding those that would be presented on later, including: • Robust Digital Devices for Harsh Environments (Lutteroth, U. of Bath): carried out some interesting work around tolerances and how this features into the manufacturing process. • Integrating Quality Control Documentation into the Open-	
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	Source Hardware Design Workflow (Bowman, U. of Glasgow): members of the pro² team visited in person in January. A charity has been set up to support the work, hundreds of people globally have already built and are using the device. The team uses a tool called GitBuilding for hardware control. This is a higher TRL than most other pro² funded projects and the team is very committed to open source; not only in their own work, but any other tools/resources they incorporate into their work must also be open source. ○ Comments: TM asked about ISO; MF said spoke with the Internet of Production, who reported that standards and compliance are holding back emergency response resources. Looking into getting compliance approval in advance of emergencies for making resources available quickly. JD: parallel to military applications, battlefield repairs – there are standardisation issues around this. • Liquid in Circuits (Wang, U. of Birmingham): working on flexible circuits using liquid metal. There is a challenge around using these circuits in conjunction with traditional electronics. ○ Comments: LEH: there is work being carried out using liquid metal in foldable iPhones; there is a lot of interest in this currently. • Device Scale Direct Composite Functional Elastomer Printing (Oldfrey, UCL): The project is developing 3D printed structures using a multi-material printed method to create customised shapes for individuals (e.g. for prosthetics). Planning to test the method by trialling with participants.	
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	○ Comments: The AB asked about whether the project included any industry partners. MF: The work is being done on the user side rather than manufacturing, but the team are aware they need to develop industry partnerships. JD: there is a particular challenge in creating prosthetics for children, so there is a lot of potential for application of this technology. JD is aware of a Basing-stoke based company (formerly called Chas-a-Blatchford) working on customised prosthetics that could be a potential partner for future work. ● <u>Laser-Induced Forward Transfer of Graphene for Interactive Devices</u> (Kim, U. of Birmingham): This project started later than the other two materials projects, due to the PI being away on maternity leave. The team is using LIFT technology to print conductive ink and study how it behaves on different surfaces, with an aim to make LIFT more accessible to others. Events: ● The network sponsored the SW UK pre-CHI event for the second year running. It was attended by about 100 people and hosted at the U. of Bristol. It was a good opportunity for raising awareness about the network amongst the regional HCI community and for advertising network activities like the Residency Scheme and summer school. ● CHI 2026: The network organised a workshop bringing together industry and academia to look at sharing design and manufacturing expertise within open source hardware communities. Some attendees came from the Shenzhen ecosystem, and	
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	there were others with specific experience (e.g. in the manufacturing industry). This helped to understand where open source hardware is not working well to serve the community. MF previously assumed that the open source community had an intention to make its work as open as possible, but in practise it may be the case that it currently only makes its work available to people with certain expertise. MF feels that open source should not just be about making things open/available, but also making it accessible – thereby enabling anyone to reproduce the work. However, the existing open source certification is not very meaningful currently due to a lack of standardisation. MF is interested in potentially developing a paper on this topic. It is a great opportunity for raising awareness of the network and connecting with others who are interested in the same area. ○ Comments: LEH asked if there are groups that work on projects together within the open source community. MF: No, there currently is little collaboration. The open software community has done more to make work accessible and is also working toward developing a production compiler that's very detailed, but nothing similar is being done in the hardware space. ● BOMNADO: The network partnered with Manchester-based Hardy & Ellis inventions Ltd, who do work on packaging inspection tables. They are a very innovative company, with many processes/tools that they have built to facilitate internal processes which may be reusable for others. They have given the network access to BOMNADO, a BOM management package, which includes supply	
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	chain management, assembly instructions and quality control. MF said he has seen a lot of BOM challenges across the network and believes that this software is a good solution. The network has hired software engineer Tom Smith who has just started recently. In his role, he will improve BOMNADO and prepare it for public use. The SG is looking at commercialising and thinking about affiliate links as a way to fund it and make it openly accessible to public. Will use network members to provide product examples for testing BOMNADO. • pro² Away Day: held in Bath in November, the time was used to discuss follow-up funding for the network. The current funding ends in December 2027. The SG need to be thinking about future funding now due to the length of the process for applying for new opportunities. There was support from a U. of Bristol research development specialist at the away day. ○ TM: suggested further funding as an agenda item for future AB meetings. MF said that network+'s are a favoured mechanism for funding, and the SG need to consider whether to extend the network or separate into smaller projects in this space. He agreed to report back on this at the next AB meeting, noting he will discuss it further with Laura McDonnell from EPSRC in the meantime. • Residency scheme: There have been some interesting applications, including a recently funded project using RF harvesting to support crop monitoring overnight. This project has the potential to produce benefits related to sustainable energy and is due to start in November 2026.	
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	• 2026 summer school: Will take place from the 14th to the 17th of July at Lancaster University. The delegate recruitment period recently closed, with 55 applications received this year and 39 papers altogether. There were applicants from 10 different countries including as far abroad as the US and Japan. The network will provide subsidised places for around 30 people, with space for up to 40 attendees in total. • Open Hardware Summit (May, Berlin): The network is sponsoring the event again this year. In return pro² receives 4 complimentary passes to the event which have been distributed to network members including two 2025 summer school alumni who will represent pro² at the event. The network is also holding a raffle as a digital goodie bag item for OHS attendees, offering one free place to the 2026 summer school. • Sustainability call: The network's latest funding call launched this week, with a focus on sustainability for device production; it closes on 30 June. The network is seeking to fund up to three projects worth up to £50k each, for a maximum duration of 9 months. This is a shorter time frame than for previous funded projects due to the network ending soon and the need to allow time for potential delays and end of project reporting. The call is well-aligned with current UKRI priorities and likely to be of interest to more applicants as a result. The network tried very hard to organise a joint call with the DICE network+ but due to funder regulations around sharing / transferring funds this was not possible in the end. pro² is still engaging with DICE on reviewing applications for one another's calls. • Staffing updates: ○ SHu is starting a new role as Bristol Digital Futures	
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	Institute manager as a 12 month secondment and will then return to pro² until the end of the grant. A temporary replacement for Sarah's role is currently being advertised with interviews taking place soon. The network is also hiring temporary administrative support to help with this transition period over the summer. • RC update on his work: ○ Mapping work: Organised workshop at CHI on information sharing, and speaking with network members on device production challenges/solutions. ○ Working on a paper on open source hardware, aiming to finish by September 2026 – the focus is on testing the accessibility of open source hardware projects, as very few provide all the required information/documentation and often what is provided is not in an accessible format for a layperson.	
12.00-12.30	Funded project demonstration: Active Material Library OH reported that the project resulted in a CHI 2024 paper 'DisplayFab' (won a best paper award); the Active Material Library (codebase and working prototype developed, conducted two workshops with researchers to support development); and there are currently two papers in submission: Spray and Etch, Printactile. The project launch was delayed by issues obtaining a visa for the project PDRA and therefore finished later than originally planned. Active Materials Library platform: the team used feedback from workshops to develop the platform. The codebase is available open	Ollie Hanton

	access on GitHub and is fully functioning, they have purchased a domain name for this (library.co.uk). They also have a mock-up design of the website UI, developed by pro² Research Designer Matt Sutton. DisplayFab Framework: built as part of OH's PhD, in collaboration with MF and pro² SG member Anne Roudaut. Spray and Etch (under submission to UIST 2026): Chaoyi Wu developed as part of PhD, looked at spraying electroluminescent materials.	
12.30-2.00	Lunch	
2.00-2.30	Funded project demonstration: Multi-modal XR prototypes CS presented on project demonstrators and workshops conducted with industry partners. Workshop participants said that the technology provided capability beyond what is currently available. They stated that the strongest benefit was around facilitating communication between end users and designers/manufacturers. It also allows for earlier decision making during the design process and with greater confidence.	Chris Snider
2.30-3.00	Funded project demonstration: Conversational Prototyping LEH presented on the project, including showcasing two demonstrators. He is holding additional workshops soon, one with industry, one with the public, and one at Nottingham Trent University. He recently presented the work at the Sketching in Hardware conference and gave a talk at Arduino. Following the project, a question remains around how AI can support hardware in a way similar to how it has made software development much more accessible to more people.	Lars Erik Holmquist