**The HIBAR Research Alliance**

Reinvigorating research for the 21st century

How can the research ecosystem be improved so that it better contributes to solving the critical problems facing society today? That’s the motivating question behind an alliance of universities and other research organisations which believes that an answer lies in carrying out more Highly Integrative Basic And Responsive (HIBAR) research projects — efforts that are both basic and use-inspired, and bring together academic and external experts as equal partners. Lorne Whitehead from the University of British Columbia in Canada argues that the synergies generated within HIBAR research projects are profoundly generative.

The demonstration in 1947 of the first transistor — the small, semiconductor device now regarded as one of the most important inventions in history — grew out of wartime interactions with scientists at Bell Laboratories, the research arm of the American Telephone and Telegraph Company AT&T. Subsequent 20th-century research in materials science led to practical benefits such as mobile phones, the Global Positioning System, and the Internet.

Recently a new name, HIBAR (Highly Integrative Basic And Responsive), has been introduced to describe use-inspired research projects that are co-led by scientists and practitioners in society. A more recent biomedical example of HIBAR research is the development of CRISPR-Cas9 gene-editing technology, which offers profound societal and scientific benefits.

Researchers in all fields, including social sciences, humanities, science, engineering, and medicine, have much to offer in the collaborations that are central to HIBAR projects. These efforts have significantly improved the way the world lives, communicates, learns, and does business, as well as how long and in what state of health, wealth, and security we exist.

Unfortunately, HIBAR research has declined in recent decades, so government, business, and academic leaders are seeking ways to encourage it in the 21st-century research ecosystem. They are doing so at a time when business-time horizons have shortened, and most university researchers concentrate on ‘curiosity-based’ projects for advancing knowledge, or ‘use-inspired basic research’, that may be related to societal problems but is still largely disconnected from wider society. This disconnect has been a long-standing tradition in universities, so promotion and tenure policies often tend to under-reward socially-partnered research projects.

In response, there is growing interest world-wide in encouraging more HIBAR research projects — university research projects that connect, as equal partners, academic and societal experts who collaborate on research projects that are optimised for the long-term efforts needed to solve important societal problems.

Despite substantial world-wide interest in this concept, universities, like many organisations, adapt slowly. Generally, that is a good characteristic at universities, which have steadfastly defended truth and advanced civilisation for generations. The drawback, however, is that when an opportunity for improvement arises, it can take a great deal of persuasion to achieve the necessary change.

An approach that has proven helpful for achieving positive change at universities is for them to form improvement alliances. This has led to the development, in 2018, of the HIBAR Research Alliance (HRA), an open alliance of organisations seeking to address this need. The idea originated in 2017 at a meeting hosted by the Association of Public and Land-Grant Universities (APLU), it now comprises a growing number of universities and other research-oriented organisations.

The group’s first key achievement was to agree to carry out the key characteristics of use-inspired and society-engage research projects, and to give this time-honoured concept a specific name. The organisation effectively chose the term ‘Highly Integrative Basic And Responsive’ to distinguish these research projects from those with weaker societal connections.

The concept of HIBAR projects is new, but today we need many more of them, especially because industry has, if anything, moved toward shorter time-frames.

**HIBAR Research Alliance**

The HIBAR Research Alliance (HRA) was launched in 2018, at a workshop supported by the US National Science Foundation. The HRA has developed into a group of organisations aiming to help catalyse changes for increasing the overall frequency and quality of HIBAR research projects. Dr Lorne Whitehead, at the University of British Columbia, currently serves as the Director of the HRA. He and other HRA partners have published several papers that describe HIBAR research, including a recent publication in the journal Technology and Innovation.

**What are HIBAR research projects?**

HIBAR research projects embrace two dualities. First, they combine the principles of basic research for advancing knowledge with the those of applied research for solving practical problems. Second, each project has dual leadership, in the sense that projects solve long-term problems. Second, each project has societal partners and integrating their motivations, methods, leadership and time-frames. In other words, the projects solve long-term problems by bringing academics together with societal partners and integrating their motivations, methods, leadership and time-frames.

Dr Whitehead explains: ‘HIBAR research projects combine use-inspired basic research, which is research that has both a basic and an applied component, with the idea of partnered visionary research, which involves co-leadership with key experts in society and has a sense of sustained urgency enabling a time-frame long enough to achieve the intended beneficial results.’

Dr Whitehead argues that this kind of research is more likely to achieve the results that 21st-century society needs. He explains: ‘Highly impactful breakthroughs are more likely when a project leadership team includes both academic researchers and societal experts who deeply understand the problem at hand. Likely that is because the success of a project depends on the quality of the many key decisions made along the way. Diverse leadership teams often make better decisions, because they comprise broader understanding of the problem and possible solutions. The different perspectives and skill sets of the leaders and team members lead to more creative discussions, better approaches, and faster experimental feedback-loops. In turn, these lead to more integrative and synergistic results. The resultant successes boost team morale and improve retention of excellent team members, further enhancing success.’

**A HIBAR research project embraces use-inspired basic research and is collaboratively led by a team that includes a non-academic expert with direct expertise on the societal problem(s) of interest.**

Examples of HIBAR research

One example of HIBAR research is an ongoing project to develop a tool to help clinicians and patients identify early-warning signs of heart failure that requires readmission to hospital.

Based at the University of California Davis Health, the project is led by Katherine Kim who has a special interest in patient wellbeing as well as in artificial intelligence (AI). Working with patients, doctors, and external partners, Dr Kim’s team has developed a mobile application which collects multiple sets of health data from patients in their own homes.

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Another example which demonstrates how HIBAR research can take place in all academic fields, not just in science, technology, engineering, and medicine, is a project for restoring and preserving historical audio recordings. Led by Carl Haber of Lawrence Berkeley National Laboratory, researchers have adapted earlier work in creating detectors for particle physics experiments to develop a digital imaging system which has led to the restoration of historically valuable archival material, including recordings of the voice of Alexander Graham Bell.

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attributes of a HIBAR project. While projects that combine the characteristics of basic and applied research are not uncommon, few of them deeply involve societal experts in key decision-making. The opportunity to increase the frequency of HIBAR research projects is therefore significant. However, there are barriers to doing so.

Academic incentive systems, for example, may unintentionally discourage faculty researchers from working on HIBAR research projects, in favour of projects which are easily and immediately quantifiable – in terms of the number of publications and citations produced, the number of graduate students involved, and the size of grants attracted.

Further, it requires teams of researchers, including external partners, whereas promotion and tenure committees may place higher value on independent work. The HRA strategy is, in turn, lead researchers to early specialisation in a narrow research field, rather than working towards a goal that may result in greater societal impact.

The HIBAR Research Alliance advocates supporting tools and resources to HIBAR research that better targets barriers and opportunities for more HIBAR research, creating more opportunities for positive societal impact while strengthening academic excellence.

The HRA strategy for shifting academic culture has three thrusts. First, outreach and dialogue to build more general awareness of and appreciation for HIBAR research and to engage collaborators. Second, collaboration to identify barriers and opportunities for more HIBAR research that better targets outreach. Third, collaboration to develop supporting tools and resources to inform and enable action of HIBAR-allied organisations, networks, and target audiences.

Acknowledging that organisational change can be challenging, Dr Whitehead identifies two requirements for success: first, the organisational change efforts must last long enough to be sufficiently intense to establish a ‘normal’ within the practice of science out of the ivory tower and into the real world. To succeed, this approach demands that universities rethink incentives to promote agility and collaboration; challenge long-held cultural expectations around the purpose of research; cultivate networks of internal and external change agents; and adopt a sustained sense of urgency towards developing solutions.

The HRA is led democratically by a governing council comprising individuals appointed by member organisations. That council developed the HRA governance structure and bylaws, and appointed a management group of six senior individuals, including a director, associate director, manager, and three senior research experts. Much of the HRA’s work is now delegated to specific Collaborative Action Groups (CAGs), each responsible for a portion of the organisation’s strategic plan. A key aspect of the HRA is that its work is open to participation from all universities as well as government and non-government laboratories, organisations and corporations. As a result, the CAGs include contributors from a wide number of organisations, including but not limited to, member organisations.

Five CAGs have so far been initiated. They are addressing topics such as academic incentive systems, HIBAR research across disciplines, cross organisational cooperation, measuring and assessing HIBAR research, and disseminating better understanding of HIBAR research. There is also an ongoing webinar series presenting examples of HIBAR research. Since each CAG’s responsibilities are broad, they generally achieve their goals through specific HRA Task Groups that have well-defined deliverables in the context of a clear project plan.

### Highly Integrative, Basic And Responsive

The HIBAR Research Alliance advocates strengthening fundamental research in a way that generates bold new solutions for society’s toughest challenges.

**Organisational change**

Dr Whitehead argues that a key shift in university culture is required to enable more HIBAR research, creating more opportunities for positive societal impact while strengthening academic excellence. The HRA strategy for shifting academic culture has three thrusts. First, outreach and dialogue to build more general awareness of and appreciation for HIBAR research and to engage collaborators. Second, collaboration to identify barriers and opportunities for more HIBAR research that better targets outreach. Third, collaboration to develop supporting tools and resources to inform and enable action of HIBAR-allied organisations, networks, and target audiences.

**HIBAR Research Alliance aims**

The HRA aims to increase the percentage of university research projects that have all of the HIBAR characteristics from an estimated 5% today to 20% by 2030. There is widespread endorsement for these ideas. A recent example is a statement by Michael Crow, President of HRA member Arizona State University. At a recent address at the annual conference of the American Association for the Advancement of Science, he observed that, ‘In recent years, the term Highly Integrated Basic and Responsive research has been adopted by a growing number of research institutions and organisations to describe use-inspired research that engages the participation of social stakeholders to solve urgent challenges. HIBAR research moves the practice of science out of the ivory tower and into the real world. To succeed, this approach demands that universities rethink incentives to promote agility and collaboration; challenge long-held cultural expectations around the purpose of research; cultivate networks of internal and external change agents; and adopt a sustained sense of urgency towards developing solutions’.

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1. **Who is eligible to contribute to HRA activities?**

   Individuals with relevant interest and expertise are welcome to join any HRA Task Group (hibar-research.org/ hra-task-groups). Organisations that may be interested in joining the HRA are asked to contact the HRA leadership team to discuss this. Anyone can sign up to the HRA mailing list, via the website (hibar-research.org/contacts). This will also inform individuals of numerous online events that are open to all, such as the HRA webinar series (hibar-research.org/category/webinars).

2. **What are the benefits of contributing to the HRA?**

   Individuals who participate in HIBAR Task Groups primarily benefit from the satisfaction of contributing to a cause that they deeply believe in. They may also benefit in other ways through collaboration with like-minded colleagues. HRA member organisations will benefit from the resultant improvements to the overall research ecosystem. Also, their employees may be more likely to engage in HRA CAGs and Task Groups, increasing their overall understanding and job satisfaction. Further, member organisations will derive reputational benefits from their support of the HRA.

3. **Accepting that the HRA is a new organisation, what evidence is there that its call for universities to engage in more HIBAR research is gaining ground?**

   Although the HRA is fairly new, it has already attracted 60 active participants, a mailing list of more than 450 individuals, a membership of 17 respected research organisations, and has five Collaborative Active Groups that collectively operate 20 Task Groups. The work has already resulted in numerous publications, and the continuing growth rate is substantial. It should also be noted that numerous other organisations have goals that are well-aligned with those of the HRA, and the HRA routinely collaborates with other organisations in areas of overlapping interest.

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**References**


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The HIBAR Research Alliance will accelerate externally-partnered university-basic research projects that address significant problems facing society.

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