

VIPC Awards Technology Commercialization Grant to VCU to Advance Energy-Efficient, Scalable Semiconductor Memory Technology

Dr. Jayasimha Atulasimha's improved data storage solution doesn't require an external power source and shows promise as an important tool in the success of next-generation computing.

RICHMOND, VA, UNITED STATES, January 15, 2025 /EINPresswire.com/ -- The [Virginia Innovation Partnership Corporation \(VIPC\)](#) today announced that



Funding from VIPC edges us one step closer to bringing this unconventional memory solution to market and we are grateful CCF saw its potential and is offering enthusiastic support as we move forward."

*Dr. Jayasimha Atulasimha,
Engineering Foundation
Professor, VCU*

[Virginia Commonwealth University \(VCU\)](#) has been awarded a Commonwealth Commercialization Fund (CCF) grant for \$100,000 to expand research conducted by Dr. Jayasimha Atulasimha. Building on commercially available technology, Atulasimha's revolutionary energy-efficient random-access memory (RAM) discovery offers potential for tapping into an anticipated \$1 billion market.

RAM is the hardware in computing devices that provides temporary storage for the data needed to run applications and open files. Spin-transfer-torque magnetic RAM (STT-MRAM) is an advanced form of memory technology used only in niche markets such as aerospace, automotive, and

defense because it is extremely energy-hungry and requires abundant electric power. Its need for such sizable power hinders more widespread adoption by other industries.

Atulasimha's group is solving this problem by developing skyrmion-mediated MRAM (SkMRAM), a nanomagnet-based RAM technique that builds upon STT-MRAM technology while significantly improving energy efficiency. By adding a layer of heavy metal to STT-MRAM, energy consumption is reduced by 100-1000x, or 2-3 orders of magnitude. The resulting product is non-volatile, meaning that it can retain data even when the device is powered off, and has a very low write-errors rate, which means that it saves energy while writing information. It also doesn't require standby power to retain information and is reliable. One patent currently covers this technology.

"We started this research as a scientific curiosity, but soon realized it has technological

significance due to its potential to be an energy-efficient, scalable, and reliable non-volatile memory solution,” said Atulasimha, Engineering Foundation Professor, Department of Mechanical and Nuclear Engineering at VCU. “Funding from VIPC edges us one step closer to bringing this unconventional memory solution to market and we are grateful CCF saw its potential and is offering enthusiastic support as we move forward.”

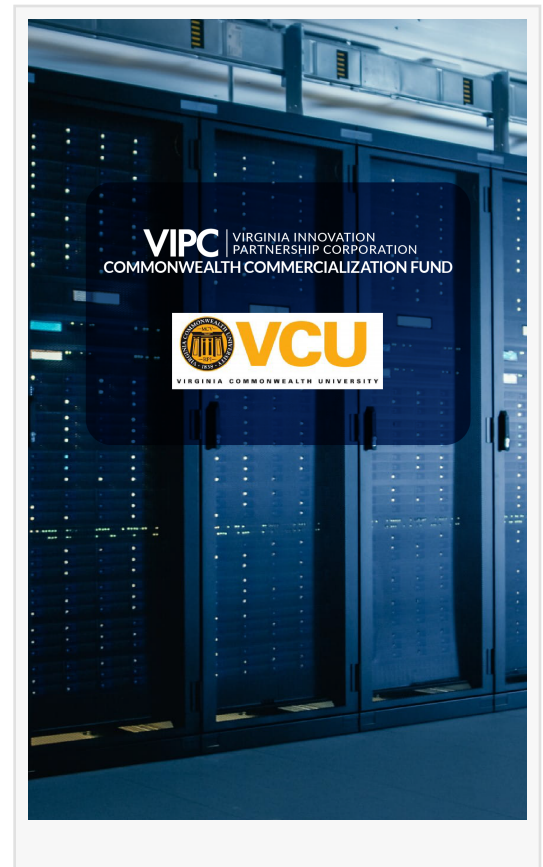
Joe Benevento, VIPC President and CEO, said, “Semiconductors, microelectronics, and nanotechnology are critical technology areas where Virginia’s universities are driving innovative research. VCU continues to be on the cutting edge for semiconductor R&D and we look forward to Dr. Atulasimha and his team advancing their latest technology discovery to address an increasingly important market need.”

Through prior grants from VCU, the Commonwealth Cyber Initiative (CCI), and the National Science Foundation (NSF), Atulasimha’s group has established and validated the underlying skyrmion approach. Leveraging CCF funds, the team will demonstrate a proof-of-concept memory element, with the goal of positioning the technology to be broadly commercialized through a new Virginia startup or by licensing to chip and memory processor foundries and manufacturers. This latest grant will be spearheaded by Md Mahadi Rajib, a PhD student in Atulasimha’s group. Project execution will also include collaboration with Professor Pedram Khalil’s team at Northwestern University and with Dr. Mike Burkland of RTX Corporation. RTX will assess the market potential of this technology for radiation hard applications in space, recognizing the possibility that this technology will present even broader market applications than currently predicted.

“I look forward to working on this research beyond my PhD, focusing on both technology development and market discovery. This initiative will build on the initial success of demonstrating small-scale memory implementation and identifying commercial opportunities worth pursuing,” commented Rajib.

A significant foundational contributor to this work is Dr. Dhritiman Bhattacharya, a former graduate student of Atulasimha and now a postdoctoral fellow at Georgetown University. Bhattacharya and Atulasimha published papers proposing skyrmion-mediated voltage-controlled switching of MRAM in 2016 and 2018, and authored another in Nature Electronics demonstrating voltage control of skyrmions, a collaborative effort that also included Dr. Kang Wang’s group at UCLA.

Virginia Commonwealth University is a public research university based in Richmond, Virginia.



About Virginia Innovation Partnership Corporation (VIPC)

Connecting innovators with opportunities. VIPC operates as the nonprofit corporation on behalf of the Virginia Innovation Partnership Authority (VIPA). VIPA / VIPC is Virginia's designated authority for leading innovation and economic development in the Commonwealth of Virginia through research, commercialization, and technology advancement; entrepreneurship, startup, and venture capital growth; and regional ecosystem, innovation network, and industry sector expansion. As part of its operations, VIPC helps attract and catalyze private investment into early-stage startup companies, provides research and technology commercialization grants to universities and entrepreneurs, and offers resource and funding support for entrepreneurial ecosystems, innovation networks, and public-private partnerships at local, state, federal levels.

VIPC's programs include: Virginia Invests | Virginia Venture Partners (VVP) | Commonwealth Commercialization Fund (CCF) | Entrepreneurial Ecosystems Development | Regional Innovation Fund (RIF) | Smart Communities | The Virginia Smart Community Testbed | The Virginia Unmanned Systems Center | Virginia Advanced Air Mobility Alliance (VAAMA) | The Public Safety Innovation Center (PSIC) | Federal Funding Assistance Program (FFAP) for SBIR & STTR | University Partnerships | Startup Company Mentoring & Engagement.

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About the Commonwealth Commercialization Fund (CCF)

VIPC's Commonwealth Commercialization Fund (CCF) accepts applications and awards funding to university research partners and entrepreneurial startups at the earliest stages of technology commercialization along the innovation continuum. These commercialization grants support R&D and early technology and market validation efforts such as the development of prototypes or minimum viable products (MVPs), customer pilots, and intellectual property protection. For more information on CCF funding opportunities and eligibility requirements, or to apply, visit www.VIPC.org.

Jennifer Hiltwine

VIPC

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