**GEN-3 SYSTEMS VISIONS**

The first Gen-3 ERCs awarded were the five in the Class of 2008.

* **Center for Integrated Access Networks (CIAN),** University of Arizona in partnership with the California Institute of Technology, Norfolk State University (HBCU), Tuskegee University (HBCU), the Universities of California in Berkeley, San Diego, and Los Angeles, and the University of Southern California – Transformative technologies for optical access networks that simultaneously achieve efficient high data rate aggregation at low cost with flexibility to support di verse user requirements, enabling affordable, flexible access to any type of service to anybody, anywhere at any time. [[1]](#footnote-1)
* **Center for Biorenewable Chemicals (CBiRC)**, Iowa State University in partnership with Rice University, the University of California, Irvine, the University of New Mexico, the University of Virginia, and the University of Wisconsin-Madison - Reduce dependence on petro-chemical feedstocks by integrating biological and chemical catalysis systems to produce biorenewable chemicals.[[2]](#footnote-2)
* **ERC for** **Revolutionizing Metallic Biomaterials (RMB)**, North Carolina A&T University (HBCU) in partnership with the University of Cincinnati and the University of Pittsburgh - Develop the fundamental knowledge and technology needed to advance biocompatible and biodegradable metal-based, implantable systems with feedback control for reconstruction and regeneration.[[3]](#footnote-3)
* **Future Renewable Electric Energy Delivery and Management (FREEDM) Systems Center*,***North Carolina State University in partnership with Arizona State University, Florida State University. Florida A&M University (HBCU), and the Missouri University of Science and Technology - Develop an electric energy distribution infrastructure system with plug and play capabilities for renewable sources and energy storage systems—i.e., develop a “Smart Grid.”[[4]](#footnote-4)
* **Smart Lighting ERC (LISA),** Rensselaer Polytechnic Institute in partnership with Boston University and the University of New Mexico - Develop fully controllable and tunable solid-state light sources that will enable energy savings through higher efficiency lighting sources and improved communication systems. [[5]](#footnote-5)

The second Gen-3 Class of four ERCs was awarded in 2011 and two of these were jointly funded by the Department of Energy – Arizona State and the University of Tennessee.

* **ERC for Quantum Energy and Sustainable Solar Technologies (QESST),** Arizona State University in partnership with the California Institute of Technology, the University of Delaware, the Massachusetts Institute of Technology, and the University of New Mexico (co-funded with DOE) - Transform the existing electricity generation system, making it sustainable, ubiquitous, and multifunctional, by developing photovoltaic and quantum energy converters, which fundamentally alter how energy is used.[[6]](#footnote-6)Jointly funded with DOE.
* **ERC for Re-Inventing America’s Urban Water Infrastructure (ReNUWIt)**, Stanford University in partnership with the University of California, Berkeley, Colorado School of Mines, and New Mexico State University - Advance new strategies for urban water systems, enabled by technological advances and informed by a deeper understanding of institutional frameworks, to achieve more sustainable solutions to urban water challenges.[[7]](#footnote-7)
* **ERC for Ultra-wide Area Resilient Electric Energy Transmission Networks (CURENT)**, University of Tennessee–Knoxville in partnership with Northeastern University, Rensselaer Polytechnic Institute, and Tuskegee University (co-funded with DOE) - Develop a nation-wide transmission grid that is fully monitored and dynamically controlled for high efficiency, high reliability, low cost, better accommodation of renewable sources, full utilization of storage, and responsive load.[[8]](#footnote-8) Jointly funded by DOE.
* **NSF Engineering Research Center for Sensorimotor Neural Engineering (CSNE),** University of Washington in partnership with the Massachusetts Institute of Technology and San Diego State University - Identify the engineering principles of neural movement control and sensory processing to enable a new generation of robust, adaptive, closed loop, sensorimotor devices that interact with human nervous systems.[[9]](#footnote-9)

In FY 2012, a new class of three NanoSystems ERCs was awarded to test the readiness of nanoscale devices and components to be integrated into systems-level technologies and deliver the desired functionality. The ERC Program and the Nanoscale Science and Engineering Program jointly funded these ERCs.

* **Nanosystems ERC for Advanced Self-Powered Systems of Integrated Sensors and Technologies (ASSIST),** North Carolina State University with Florida International University, Pennsylvania State University, and the University of Virginia – Develop nanotechnology enabled miniature, self-powered, wireless wearable sensors that enable correlation between personal health and personal environment and empower patients and doctors to manage wellnessand improving global health.[[10]](#footnote-10)
* **Nanosystems ERC for Translational Applications of Nanoscale Multiferroic Systems (TANMS)**, the University of California, Los Angeles with Cornell University, UC Berkeley, and California State University Northridge (CSUN) – Develop a fundamentally new approach coupling electricity to magnetism using engineered nanoscale multiferroic elements to enable increased energy efficiency, reduced physical size, and increased power output in consumer electronics.[[11]](#footnote-11)
* **Nanosystems ERC for Nanomanufacturing Systems for Mobile Computing and Mobile Energy Technologies (NASCENT),** he University of Texas at Austin with the University of California, Berkeley and the University of New Mexico – Develop high throughput, reliable and versatile nanomanufacturing systems and associated processes to take nano-science discoveries from the lab to the marketplace and advance the rapidly emerging area of mobile computing technologies.[[12]](#footnote-12)
1. Synthesized from: https://www.optics.arizona.edu/research/centers/cian [↑](#footnote-ref-1)
2. 17 ERCs by Tech Cluster (February 2014) http://www.erc-assoc.org [↑](#footnote-ref-2)
3. Ibid. [↑](#footnote-ref-3)
4. Ibid [↑](#footnote-ref-4)
5. Ibid. [↑](#footnote-ref-5)
6. Ibid. [↑](#footnote-ref-6)
7. Ibid. [↑](#footnote-ref-7)
8. Ibid. [↑](#footnote-ref-8)
9. Ibid. [↑](#footnote-ref-9)
10. https://assist.ncsu.edu/about/goals/ [↑](#footnote-ref-10)
11. http://www.tanms-erc.org/ [↑](#footnote-ref-11)
12. http://nascent-erc.org/about-us/ [↑](#footnote-ref-12)