Mission
Chaotic systems are deterministic; that is, their behavior is completely described by mathematical
equations. In spite of this deterministic nature, the exact state of a chaotic system rapidly becomes
unpredictable. The Nonlinear Circuits and Systems Laboratory investigates novel chaotic systems and
their electronic implementations.

Capabilities
Located in room A-211 of the WMU College of Engineering and Applied Sciences, the laboratory
features instrumentation and components to support the design, analysis, and validation of electronic
circuit implementations of chaotic circuits.

Research
• Novel continuous and discrete time chaotic circuits
• Synchronization of chaotic circuits

Support
NASA Michigan Space Grant Consortium
WMU Faculty Research and Creative Activities Support Fund

Example Publications
1. G. Grassi and D. A. Miller, "Dead-beat full state hybrid projective synchronization for chaotic maps using a
1824-1830, April 2012.
2. G. Grassi and D. A. Miller, "Arbitrary observer scaling of all chaotic drive system states via a scalar
4. G. Grassi and D. A. Miller, "Recovery of successively induced discrete-time hyperchaotic oscillator
perturbations via cascaded nonlinear observers," *International Journal of Bifurcation and Chaos*, vol. 18,
5. G. Grassi and D. A. Miller, "Projective synchronization via a linear observer: Application to time-delay,
1337-1342, April 2007.
6. G. Grassi and D. A. Miller, "Theory and experimental realization of observer-based discrete-time
hyperchaos synchronization," *IEEE Transactions on Circuits and Systems-I: Fundamental Theory and
Transactions on Circuits and Systems-I: Fundamental Theory and Applications*, vol. 48, pp. 366-374,
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