

**8<sup>th</sup> ICGC 2018 Session:**

**Selective microwave heating of organic reaction mixtures**

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**Abstract:**

Dudley Lab research contributes to the development of emerging and enabling technologies for greener and/or more efficient chemical synthesis. This seminar will focus on the use of microwave electromagnetic radiation to produce the thermal energy needed to accelerate dynamic chemical processes. Thermal chemical reaction mixtures are typically subjected to convective heating. The physics of convective heat transfer underlies all of physical organic theory, which guides our fundamental understanding of thermochemical processes. Microwave energy, in contrast, produces heat by a dielectric heating mechanism, which needs to be understood in order for us to gain maximum benefit from this new technology. On behalf of a collaborative research team, the speaker will describe a physical model for selective heating of macroscopically homogeneous organic reaction mixtures and reaction systems in which microwave-specific rate enhancements have been documented both qualitatively and quantitatively. Recent efforts to apply this model advantageous in chemical synthesis will be highlighted.

**References:** (if applicable)

1. Dudley, G. B.; Stiegman, A. E. Changing perspectives on the strategic use of microwave heating in organic synthesis. *Chem. Rec.* **2018**, *3*, 381–389.
2. Dudley, G. B.; Richert, R.; Stiegman, A. E. On the Existence of and Mechanism for Microwave-Specific Reaction Rate Enhancement. *Chem. Sci.* **2015**, *6*, 2144–2152.



*Gregory B. Dudley was born in 1974 in Chicago and grew up in Miami USA. He received a B.A. from FSU in 1995 and a Ph.D. from MIT in 2000, and NIH Postdoctoral Fellowship for work at the Sloan–Kettering Institute for Cancer Research from 2000–2002. He is currently the Eberly Family Distinguished Professor of Chemistry and Department Chair of the C. Eugene Bennett Department of Chemistry at West Virginia University in Morgantown, WV. Professor Dudley has received awards for classroom teaching, innovation, and scholarship for his work in organic synthesis and methodology.*