

# LIEBIG LECTURESHIP

der Liebig-Vereinigung für Organische Chemie

in der Gesellschaft Deutscher Chemiker

January 2023

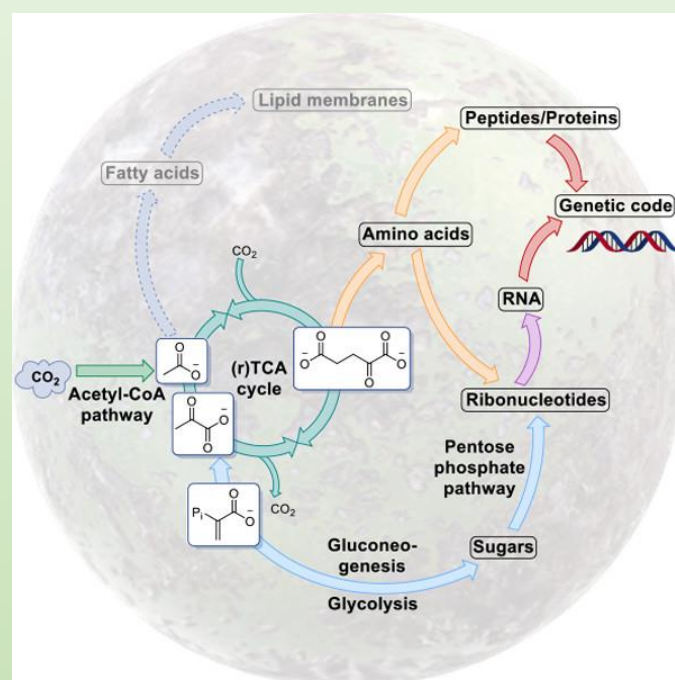
Joseph Moran

University of Strasbourg & CNRS/F



## Nonenzymatic Metabolic Reactions and Life's Origins

Like all dynamic self-organized systems found in nature, the self-organized chemistry that initiated life must have been driven into existence by the non-equilibrium nature of its environment. This pre-life chemistry would have been enabled by natural catalysts such as pH gradients, metal ions, and minerals. Due to the difficulty of making fundamental changes to a continuously operating and highly interconnected system, this network of reactions, or proto-metabolism, would likely still share many similarities with biological metabolism. Our team is experimentally reconstituting nonenzymatic metabolic processes and extrapolating from the results to identify the initial conditions that triggered self-organization. This talk will summarize our experimental progress towards this goal.



[1] Review: *Chem. Rev.* **2020**, *120*, 7708. [2] AcCoA pathway: *Nat. Ecol. Evol.* **2018**, *2*, 1019; *Nat. Ecol. Evol.* **2020**, *4*, 534. [3] rTCA cycle: *Nat. Ecol. Evol.* **2017**, *1*, 1716; *Nature* **2019**, *567*, 104; *Angew. Chem. Int. Ed.* **2022**, *61*, online. [4] Transamination/reductive amination: *J. Am. Chem. Soc.* **2021**, *143*, 19099; *Angew. Chem. Int. Ed.* **2022**, *61*, e202212237. [5] Pyrimidine biosynthesis: *Angew. Chem. Int. Ed.* **2022**, *61*, e202117211.



<b>München</b>	Tuesday	January 17 <sup>th</sup>
<b>Gießen</b>	Wednesday	January 18 <sup>th</sup>
<b>Berlin</b>	Thursday	January 19 <sup>th</sup>
<b>Münster</b>	Tuesday	January 24 <sup>th</sup>
<b>Köln</b>	Wednesday	January 25 <sup>th</sup>
<b>Düsseldorf</b>	Thursday	January 26 <sup>th</sup>

Joseph Moran was born in Montréal, Canada in 1982. After completing his B.Sc. and a Ph.D. in synthetic organic chemistry in 2009 (Prof. André Beauchemin, University of Ottawa), he did postdoctoral work in biorthogonal chemistry (Prof. John Pezacki, NRC Canada) and transition metal catalysis (Prof. Michael Krische, University of Texas). He joined the University of Strasbourg's ISIS institute as an Assistant Professor in 2012 and was promoted to Professor in 2018. His research interests lie at the interfaces of catalysis with prebiotic chemistry, organic synthesis, and light-matter interactions.