

**THÈSE PRÉSENTÉE A L'UNIVERSITÉ D'ORLÉANS  
POUR OBTENIR LE GRADE DE  
DOCTEUR DE L'UNIVERSITÉ D'ORLÉANS**

**PAR  
Avinash Vicholous Dass**

**ÉCOLE DOCTORALE SSBCV  
Discipline : Chemistry**

**Stochastic Prebiotic Chemistry**

Soutenue Publiquement  
**Le 14 décembre 2018 à 09 h 30**  
*Lieu : l'amphithéâtre Charles Sadron (CNRS)*

**MEMBRES DU JURY :**

**Dr. Frances Westall** Director of Research, CNRS Orleans  
**Prof. Terence P Kee** Reader, University of Leeds

**RAPPORTEURS :**

**Dr. Jean-François Lambert** Professor, Sorbonne Université, Paris  
**Dr. Grégoire Danger** Maître de Conférences - Université d'Aix Marseille

**JURY :**

**Prof. Francesco Piazza** Professor CNRS CBM  
**Dr. Thomas Georgelin** Maître de Conférences, Sorbonne Université-CNRS  
**Prof. Hervé Cottin** Professor, Université Paris-Est Créteil

**RÉSUMÉ**

The thesis introduces a 'stochastic approach' to origins of life research and the implicit objective of this thesis is to bridge the wide gap that exists between the various domains involved in origins of life studies, and bring them together under one larger domain of stochastic systems chemistry. The idea of a "primordial soup" has been subject to extensive criticism from thermodynamic, biochemical and geochemical perspectives, yet recent advancements have made clearer the plausibility of this theory. Compelling arguments are put forth to encourage experimentation that is inclusive of realistic geological settings. Adhering to the proposed new paradigm, three distinct yet innately linked experiments were proposed and undertaken – the Photochemistry on the International Space Station experiment (PSS), the inorganic hydrogel environment experiment and studies involving mineral-influenced formose reaction in a flow reactor.

Centre de Biophysique Moléculaire (CBM)