

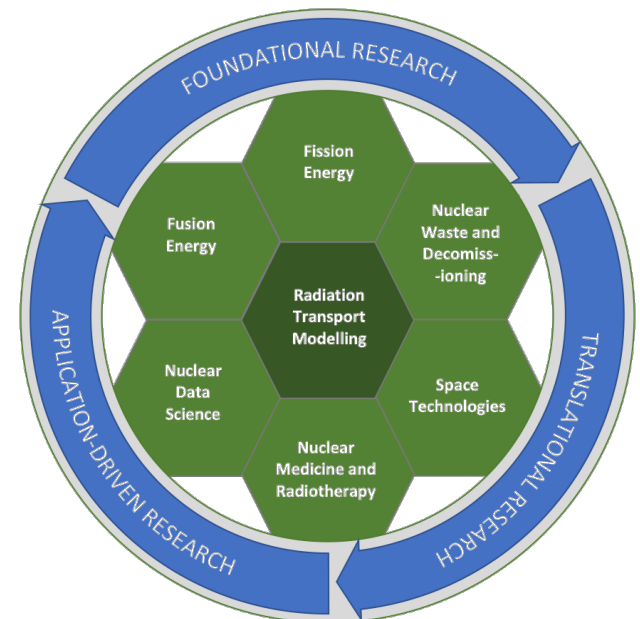


MaThRad

The 'W' logo is a stylized blue letter 'W' with pink circular nodes at its vertices. A dashed blue arrow points from the bottom-left node to the top-left node. Above the top-left node is a blue orbital path with two pink nodes, and a blue arrow points from the top-left node to the top-right node.

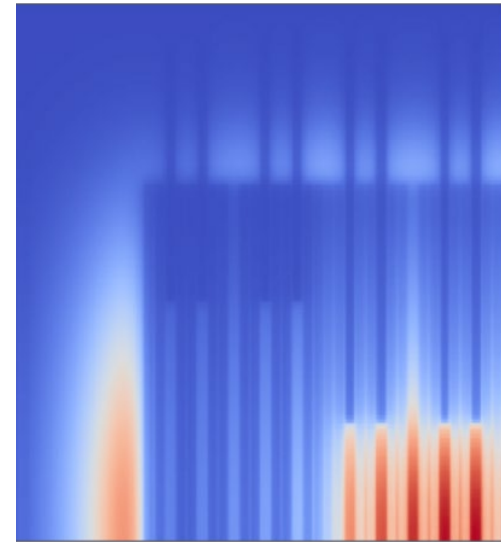
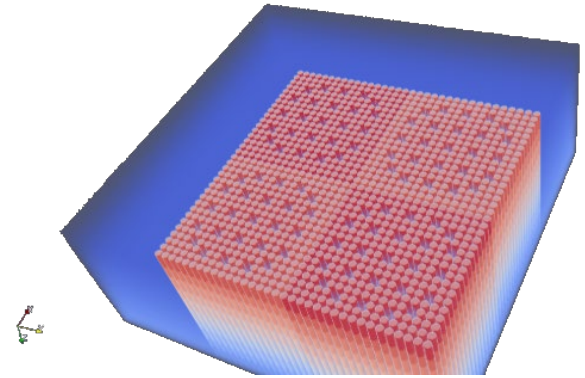


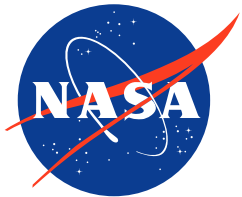
- Mathematical Theory of Radiation Transport: Nuclear Technology Frontiers
- £7M, 5-year EPSRC Program Grant
- Translate mathematical advances in probability theory and inverse problems to MC radiation transport
- Reactor analysis, criticality, shielding, medical and space applications
- 26 partners from industry and academia
- 30 postdoc-years, up to 10 PhDs
- Internships and hosting visitors
- Industry workshops and symposia
- UCLH proton treatment team + beam time



Vision

- **Fundamentally disruptive approach** – breaks existing siloes integrates interdisciplinary research
- **Foundational:** Developing mathematics of spatial branching processes, interacting particle system MC, inverse problems
- **Translational:** algorithms, tested against real-world physical, engineering and clinical demands, showcased on dedicated research software (SCONE)
- **Application-driven:** Industry workshops, case studies, internships to remain relevant & build future capacity



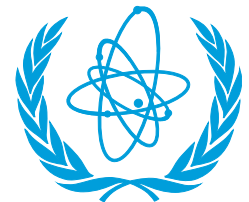


VTT **Jacobs**

EPFL



**Rutherford
Cancer Centres**



IAEA

Updates



- 6 Postdocs have been recruited
- 6 PhDs aligned with the project already working or to start in October
- SCONE training course at Warwick (as we speak)
- 2 workshops held to identify research priority areas
- Medical physics in London – 56 participants from industry and academia
- Reactor Physics in Bournemouth – as part of ANSWERS seminar
- Visits and seminars
 - Tom Sutton (former KAPL): Neutron clustering
 - John Tramm (ANL): Random Ray Method
 - Andrea Zoia (CEA) and Eric Dumonteil (IRSN)
 - Symposium on Monte Carlo with Tsinghua University

Medical Physics Workshop

- 9-10 February 2023, Friends House, London
- Work packages: Radiation transport for medical applications, Sensitivity and uncertainty in medical and reactor physics, Case studies and industrial engagement
- Emerging research themes
 - Robust treatment optimisation under uncertainty
 - Prediction of radiation damage (RBE/LET) along tracks
 - Speed up and automation of treatment planning
 - Delivered dose verification

