David Crighton Medal 2025: citation for Alain Goriely

Professor Alain Goriely of the University of Oxford is awarded the 2025 David Crighton Medal by the Institute of Mathematics and its Applications and the London Mathematical Society. The award is in recognition of his deep and influential mathematical insights into mechanical and biological processes and materials, for his support of early career mathematicians, and his contributions to the public understanding of mathematics and its applications.

Alain's research has opened new ways of looking at phenomena. His early research in dynamical systems provided new criteria for the existence of chaotic solutions and developed techniques to describe integrability in complex time. In mechanics he introduced novel ideas for how to model filaments, leading to a general stability theory applicable in many areas. In particular he described a new instability he called 'tendril perversion' that explains the entanglement of vines and other biological structures. He also developed a classification of nonlinear solids that determines the types of defects that can occur. This interaction between materials and their dynamic properties underpins ideas of growth and form going back to D'Arcy Thompson over one hundred years ago. Alain was able to develop mathematical tools that describe growth-induced instabilities in elastic materials, leading to pattern formation in fungi and bacteria. In 2022 he was elected a Fellow of the Royal Society.

Throughout his career he has taken on positions of responsibility and supported colleagues. At the University of Arizona in Tucson he was programme director for applied mathematics. He moved to Oxford in 2010 as the first Statutory Professor in Mathematical Modelling, and he has taken many leadership roles: Director of the Oxford Centre for Collaborative Applied Mathematics, Director of the International Brain and Mechanics Lab, and Director of External Relations and Public Engagement for the Mathematics Institute in Oxford. He has supervised over 20 postdoctoral researchers and a similar number of PhD students. He set up the first UK Retreat for Applied Mathematicians and has sat on numerous committees for funding bodies and learned societies.

On top of this commitment to the mathematics community he has had impact on the public view of mathematics more generally. He wrote the Oxford Very Short Introduction to Applied Mathematics (which includes a playlist of music accompanying each chapter and an excellent section on the length of time required to roast a bird), he founded the Oxford Mathematics series of public lectures, and he co-designed Moriarty's blackboard in the Sherlock Holmes films. He is currently the Gresham Professor of Mathematics.

All Alain's activities combine a deep understanding of mathematics with an appreciation of the history and culture of the problems he studies. This makes his talks and papers all the more engaging. Alain fits the descriptor for the Crighton Medal perfectly: he has been involved with the community at all levels, he supports mathematics and mathematicians in many different ways, and he is an extraordinarily gifted and influential mathematician. This makes Alain Goriely a very worthy recipient of the Crighton Medal.