2026 Summer School in Applied Molecular Microbiology Report

This was the eleventh John Innes/Rudjer Bošković Summer School in Applied Molecular Microbiology and it was held between the 12th and 19th September 2026 in the historic UNESCO World Heritage Site city of Dubrovnik, Croatia.

The first in this series of summer schools was held in 2007 at the Mediterranean Institute for Life Sciences (MedILS) in Split. Eight of the following schools (in 2008, 2010, 2012, 2014, 2016, 2018, 2022, 2024 and 2026) took place at the Inter-University Centre (IUC) in Dubrovnik, while the 2020 event took place on-line. Summer School alumni now number around 500, many of whom are now Principal Investigators.

The co-directors of the course were Mervyn Bibb, Barrie Wilkinson, Matt Hutchings and Andy Truman from the John Innes Centre, Greg Challis from the University of Warwick and Monash University, and Duška Vujaklija of the Rudjer Bošković Institute.

In addition, the internationally recognised faculty consisted of Lona Alkhalaf (University of Warwick, UK), Francesca Berini (University of Insubria, Italy), Marie Elliot (McMaster University, Canada), Paul Jensen (Scripps Institution of Oceanography, USA), Roberto Kolter (Harvard University, USA), Mônica T. Pupo (University of Sao Paulo, Brazil), Gerry Wright (McMaster University, Canada) and María Mercedes Zambrano (Corporación Corpogen, Colombia). Administrative support was provided by Naomi Wang and Sarah Tolland (from the John Innes Centre).

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Course content, participants and faculty

The summer schools were founded to recognise the growing interest in microbial metabolites that resulted from recent developments in sequencing technology, bioinformatics and chemical analysis, coupled with the need for new natural products with applications in medicine (for example, as much needed antibiotics) and agriculture.

A particular aim is to make connections between the roles of small molecules in microbial communities, including cell-to-cell signalling and interactions between microbes and other inhabitants of their ecological niches, and the exploitation of the metabolites as drugs and other pharmaceuticals.

The following lectures were presented:

The wonderful world of microbes and their specialised metabolites
Natural products overview
Polyketide and terpene biosynthesis
Peptide biosynthesis
Natural products in industry
Big data and tools for metabolite discovery
Metabolite discovery from specialised niches
Antibiotic discovery and purification
Regulation of biosynthesis
Techniques to analyse gene regulation
Structural biology in biosynthesis
Microbes through the lens of ecology
Plant-microbe interactions
Evolution of pathways/phylogenetics
Metabolism associated with insect-microbe interactions
Engineering biosynthesis and synthetic biology
Resistance guided discovery

New frontiers in biosynthesis and ecology

The 44 applicants selected for the Summer School were based in 20 different countries from all over the globe, with several additional nationalities represented.

Two-minute flash talks and posters

Each student gave a two minute – two slide flash talk to outline their current research followed by detailed discussion at one of three poster sessions. Students and faculty alike thought that this format was highly successful and enjoyable.

Computer workshops

Lona Alkhalaf and Greg Challis ran two computer workshops that used bioinformatics tools that are freely available on the internet and that are commonly used for the analysis of specialised metabolite biosynthetic gene clusters. They used a gene cluster encoding a cryptic modular PKS assembly line in the model actinomycete *Streptomyces coelicolor* A3(2) as an example. It taught how to identify putative catalytic domains within the PKS and how to decide whether they are likely to be functional. The substrate specificity of the acyltransferase domains within the PKS were predicted, as well as the stereochemical control imparted by the ketoreductase domains. This culminated in a predicted structure for the fully assembled polyketide chain attached to the final module of the synthase and a hypothesis for the mechanism of chain release from the PKS.

Small Group Discussions and Challenge Project

To complement the lectures, students and faculty participated in Small Group Discussions, with the topics chosen by the students. Topics included: Microbial interactions and chemical ecology; Expression of BGCs in natural settings; Techniques for genetic manipulation and heterologous expression; Regulation of specialised metabolism; Dissecting biosynthetic pathways and enzyme function; Natural product purification and structural determination; How do we find and develop new antibiotics?; Bioinformatics and genome mining for natural product discovery; Evolution of specialised metabolism. In addition, the students undertook Challenge Projects. Many current global problems could be eased with the help of microbes and their specialised metabolites. Examples include soil degradation, environmental pollution and antibiotic resistance. The aim of the Challenge Project was to define a current major problem and come up with an innovative plan to address it. Nine groups of students each developed a proposal and presented it a "3-minute pitch" at the end of the course to all of the participants.

Summer School attendees 2026



In addition to the academic programme, students and faculty were able to continue to discuss science and career development during a relaxing boat trip to the beautiful village of Cavtat and the equally impressive island of Lokrum.



SSAMM Dubrovnik 2026

Details of the next Summer School will be posted on the John Innes Centre website in due course.