

# Complexity and emergence in marine ecosystems/seascape: Theory, mechanisms and data

Synergy Summer School

30 June – 4 July 2025

 **AtlantECO**  
Atlantic Ecosystems Assessment, Forecasting & Sustainability

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## Synergy Summer School 2025 “Seascape”

30 June – 4 July 2025

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## 1 Brief overview

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### Summer school

**Title:** Complexity and emergence in marine ecosystems/seascape: theory, mechanisms and data

**Aim:** to stimulate discussions around the most important theoretical and experimental challenges in the context of open ocean seascape ecology. That is, to introduce the ocean fluid dynamics into current theoretical frameworks (community structure, biogeographies, niche concept, effectiveness of the active tracer response, persistence and fitness, possible functional redundancy, stability of the metabolic machinery with respect to species turnover, etc.) and in the design of new multidisciplinary studies.

**Key points:** community structures and functioning, reactive dynamics, emerging patterns and predictability for pelagic oceanic ecosystems, i.e., ecosystems whose substrate is a fluid.

**Format:** scientific lectures, interactive workshops, seminars and students' presentations

**Dates:** 30 June – 4 July 2025

**Scientific directors:** Daniele Iudicone, Patrizio Mariani, Bruno Buongiorno Nardelli, Meike Vogt, Alejandro Maass

**Venue:** [Sorriso Thermae Resort & SPA](#)

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WiFi (Hotel): Sorriso Resort - Password: sorriso1234

WiFi (Venue): Direzione - Password: direzione4321

## 2 SynSS25 Programme

	<b>Mo 30/06</b> <b>Ocean</b> <b>dynamics and</b> <b>ecological</b> <b>connectivity</b>	<b>Tu 01/07</b> <b>Biodiversity</b> <b>concepts and</b> <b>methods</b>	<b>We 02/07</b> <b>Metabolic</b> <b>Modelling</b>	<b>Th 03/07</b> <b>Global</b> <b>processes and</b> <b>climate</b>	<b>Fr 04/06</b> <b>Complex</b> <b>theory for</b> <b>ecology</b>	<b>Sa 05/07</b>
<b>9:00-10:30</b>	The oceans as a fluid - Enrico Ser Giacomo	Lucie Bittner  Biodiversity: genetics and genomics	Ocean microbiomes: The emerging patterns - Damien Eveillard	Ocean microbiome ecology: concepts - Meike Vogt	Complex systems - Emanuele Pigani	Networking and discussions
<b>10:30-11:00</b>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>
<b>11:00-12:30</b>	The oceans as a fluid - Enrico Ser Giacomo	Lucie Bittner - Biodiversity: genetics and genomics	Ocean microbiomes: The emerging patterns - Damien Eveillard	Ocean microbiome ecology: concepts - Daniele De Angelis	Complex systems - Emanuele Pigani	Students' feedback
<b>12:30-14:30</b>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	<i>Lunch break</i>	
<b>14:30-16:00</b>	Thinking out the box: Open questions in marine science - Daniele Iudicone & Maurizio Ribera D'Alcalà	Workshop/ debate:  <i>Material provided during the course</i>	Workshop/ debate:  <i>Material provided during the course</i>	Workshop/ debate:  <i>Material provided during the course</i>	AI: Tools and concept - Bruno Buongiorno Nardelli	
<b>16:00-16:30</b>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	
<b>16:30-18:00</b>	Ice breaker: students' presentations/posters session	Seminar  Patrizio Mariani Data driven earth system modeling (tbc)	Seminar  Sabrina Speich	Seminar  Naomi Levine (online)	Walk and Talk	