Silica: from stardust to the living world

Course Description

Silicifiers are among the most important living organisms on the planet Earth, where silicon is the second-most-abundant element in the Earth's crust, making our home within the solar system, a “silica planet”. The “Silica School” is an e-learning experience (a small private online course, or SPOC) hosted by the University of Brest on the subject of “**Silica: from stardust to the living word**” that examines the role of silica under four major themes: (1) Silica in the Universe, (2) Silica in the Ocean, (3) Silicifiers in the living world, and (4) Silica in the future. The objective of the SPOC is to offer students the tools and knowledge to help them better understand the importance of silica in the natural world alongside the opportunity to interact with international experts studying silica in the fields of chemistry, biology, geology, and physics.

MODULE 1: Silica in the universe

Class Name	***Instructor***	***Institute/University***
Earth: a silica planet: basic knowledge in geochemistry and geology	**Sophie Opfergelt**	Université catholique de Louvain, Belgium
The possibility of silicon-based life in the universe	**Janusz Petkowski**	Massachusetts Institute of Technology, USA
The global silicon cycle	**Jill Sutton/Patricia Grasse**	University of Brest, France /IDiv German Centre for Integrative Biodiversity Research, Germany

MODULE 2: Silica in the ocean

Class Name	***Instructor***	***Institute/University***
Paleo-ocean: past variations in the global biogeochemical silica cycle	**Katharine Hendry**	University of Bristol
Modern-ocean: the world ocean biogeochemical silica cycle	**Paul Tréguer**	University of Brest, France
The fate of diatoms: its meaning for Carbon and Silicon cycles	**Brivaëla Moriceau**	Centre national de la recherche scientifique, France

MODULE 3: Silicifiers in the living world

Class Name	***Instructor***	***Institute/University***
Diversity of diatoms	**Karine Leblanc**	Mediterranean Institute of Oceanography, France
Siliceous sponges	**María López-Acosta**	University of Brest, France/ Instituto Investigaciones Marinas (IIM-CSIC), Spain
Silicification processes in the living world	**Kim Thamatrakoln**	Rutgers, the State University of New Jersey, USA

MODULE 4: Silica in the future

Class Name	***Instructor***	***Institute/University***
Chemistry of condensed matter	**Jacques Livage**	UPMC Sorbonne Universités, France

Format

The course, divided into 4 modules comprised of a total of 10 individual classes, will take place over an intense 3-week period. Each class will be available online to allow the student to acquire knowledge on each concept at their own pace (within a limited 3-week timeframe). Many online classes will include specific instructions for the students to perform tasks (discussion board, individual homework assignment) and/or quizzes to both help the student practice and to assess student comprehension. In addition, the course will have a time set aside for face-to-face interactions with some of the class tutors.

Prerequisites

Most of the classes in this SPOC require a post-graduate level of knowledge and it is strongly recommended that students have an undergraduate degree in science (e.g. Biology, physics, chemistry, geology).

Instructors

Chris Bowler (TBA)	Ecole normale supérieure Paris, France
Patricia Grasse	IDiv German Centre for Integrative Biodiversity Research, Germany
Katharine Hendry	University of Bristol, England
Karine Leblanc	Mediterranean Institute of Oceanography, France
Jaques Livage	UPMC Sorbonne Universités, France
María López-Acosta	University of Brest, France/Instituto Investigaciones Marinas (IIM-CSIC), Spain
Brivaëla Moriceau	Centre national de la recherche scientifique, France
Sophie Opfergelt	Université catholique de Louvain, Belgium
Janusz Petkowski	Massachusetts Institute of Technology, USA
Christophe Rabouille (TBA)	CEA – De la recherche à l'industrie, France
Jill Sutton	University of Brest, France
Kim Thamatrakoln	Rutgers, the State University of New Jersey, USA
Paul Tréguer	University of Brest, France

Evaluation

Students taking the Silica School SPOC are required to demonstrate leaned knowledge by completing assignments, using quizzes, and interacting with the instructors via online forums. A final quiz covering all topics will permit evaluation of the student's comprehensive knowledge, which will result in the presentation of a certificate (must obtain 70%).