

# Croatian-Swiss Research Programme (CSRP)

Final Event - Thursday, 19 October 2023, Zagreb, Croatia

## Input, Output, and Impact

André Strasser



# Input

## Human resources for 11 projects:

11 Croatian project leaders

11 Swiss project leaders

12 Croatian PhD students

7 Swiss PhD students

5 Croatian post-docs

3 Swiss post-docs

4 Croatian collaborators

3 Swiss collaborators

## Financial resources:

Swiss contribution: 4 mio CHF (85.7 %)

Croatian contribution: 0.67 mio CHF (14.3 %)

(projects could be extended if impacted by COVID-19 or earthquake)

+ Competence

+ Enthusiasm

+ Collaboration

# Input

The HRZZ and SNSF administrative team

Steering committee:

NCU, SDC, HRZZ, SNSF



# 11 projects

Agricultural and forestry sciences (1)

Cellular biology (1)

Climatology (1)

Electrical engineering (1)

Immunology (1)

Material sciences (2)

Mathematics (1)

Molecular biology (1)

Social sciences (2)

University of Zagreb (8)

University of Rijeka (1)

Ruder Boskovic Institute (1)

Inst. of Social Sciences Ivo Pilar (1)

ETH Zurich (4)

EPF Lausanne (2)

University of Berne (1)

University of Geneva (1)

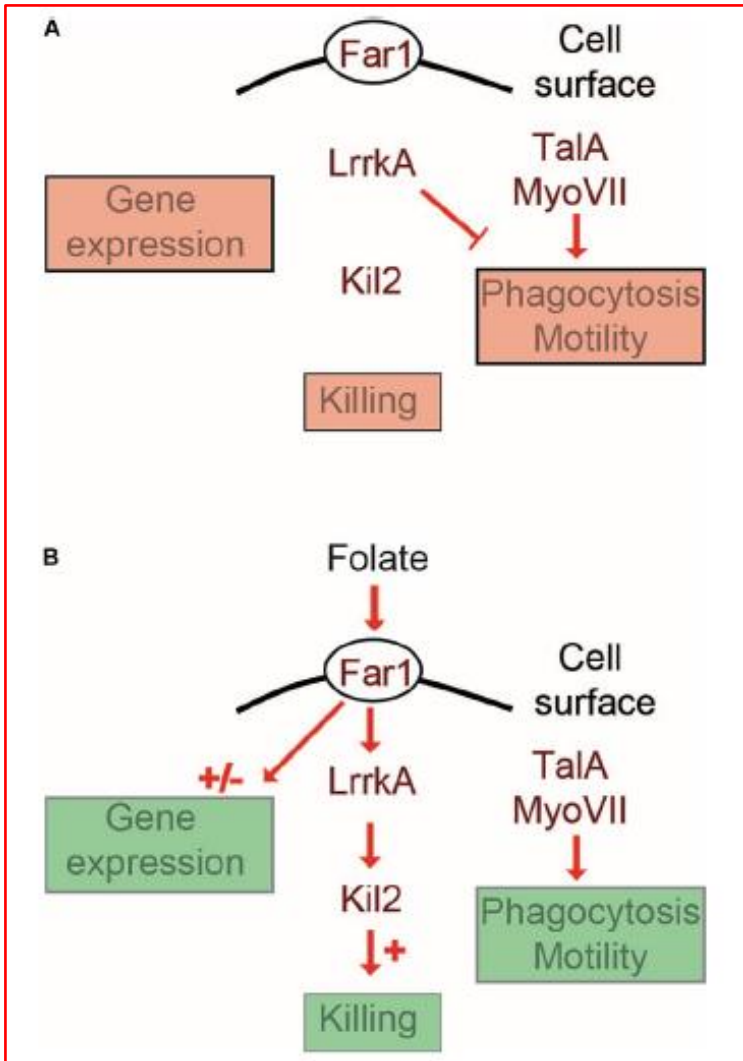
University of Lausanne (1)

WSL (1)

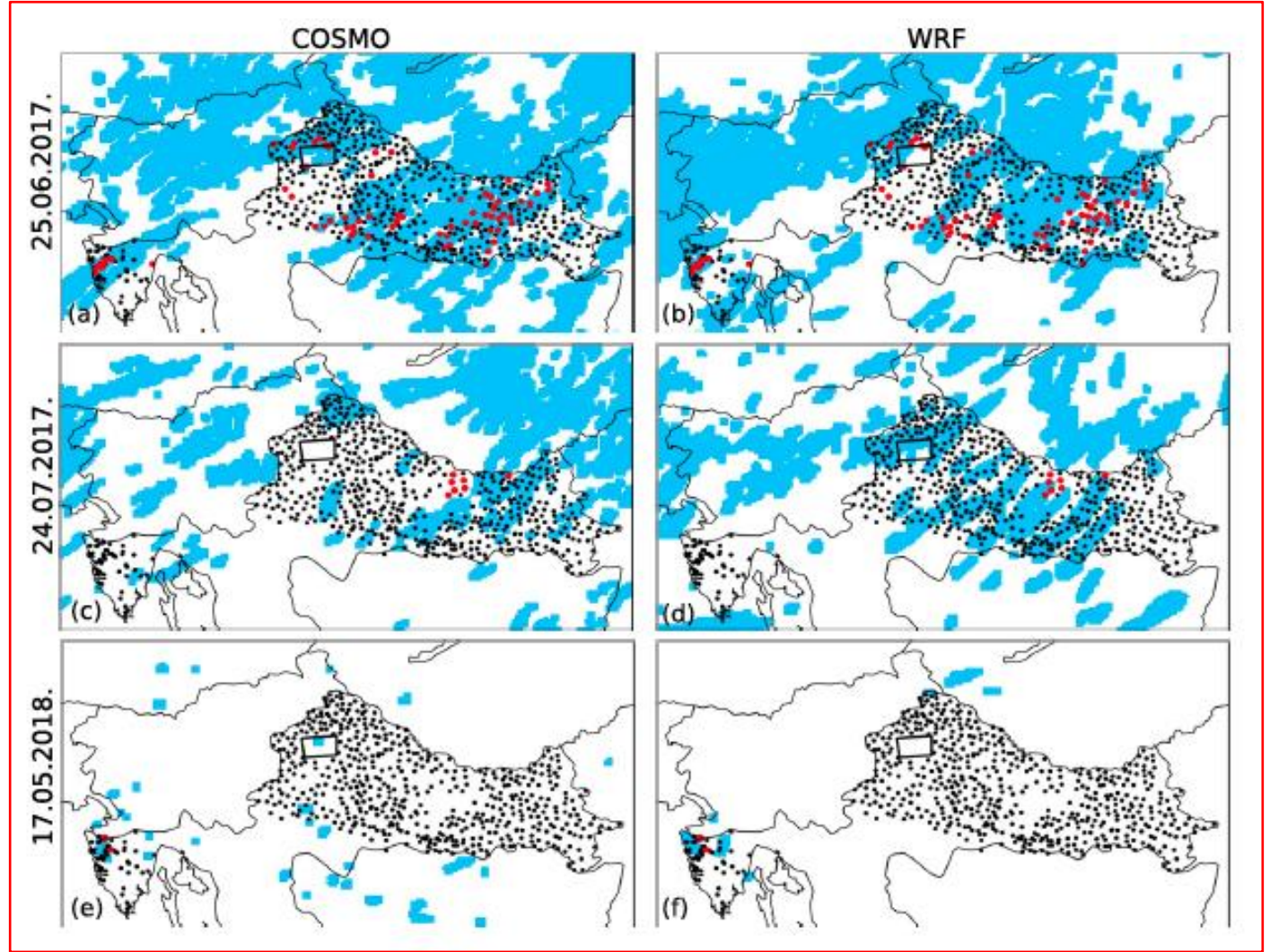
FHNW (1)



# From phagocytes to hailstorms over Croatia



Bodinier et al. (2021)



Malecic et al. (2023)

# **Output (2019 -2023)**

**79 Academic events**

**14 Public communications**

**12 Knowledge transfers**

**8 Awards**

**6 Use-inspired outputs**

**4 Follow-up projects**

**Collaboration with 12 other countries**

**- and more to come...**

# Output

frontiers | Frontiers in Microbiology

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## Physiological variations in hypovirus-infected wild and model long-term laboratory strains of *Cryphonectria parasitica*

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**Introduction:** Forest ecosystems are highly threatened by effects of climate change and invasive pathogens. Chestnut blight, caused by the invasive phytopathogenic fungus *Cryphonectria parasitica*, has caused severe damage to European chestnut groves and American chestnut in North America. Within Europe, chestnut blight is widely mitigated through biological control that uses *Cryphonectria hypovirus 1* (CHV1). Viral infections can cause oxidative stress in their hosts leading to the production of reactive oxygen species (ROS) and the stimulation of ROS (reactive oxygen species) and NADPH oxidase activity.

**Methods:** To fully understand the interactions between *C. parasitica* and CHV1, it is vital to determine oxidative stress levels, especially considering that other abiotic factors, such as temperature and humidity, can also impact oxidative stress levels. We determined oxidative stress levels in *C. parasitica* isolates from two Croatian chestnut groves (EP713 and CR23) that have been infected with CHV1.

**Results and Discussion:** We determined oxidative stress levels by measuring stress enzyme activity (SOD, MDA) and total non-protein thiols (MDA) and total non-protein thiols (MDA) and total non-protein thiols (MDA) in long-term model strains of *C. parasitica* and glutathione S-transferase (GST) activity. Our results indicate that oxidative stress is likely arising from the interaction between *C. parasitica* and CHV1, especially in stress resilient strains. Our research indicates that oxidative stress levels vary from the different model strains, but no discernible effect on oxidative stress levels was observed. Our research indicates that oxidative stress levels vary from the different model strains, but no discernible effect on oxidative stress levels was observed. Our research indicates that oxidative stress levels vary from the different model strains, but no discernible effect on oxidative stress levels was observed. Our research indicates that oxidative stress levels vary from the different model strains, but no discernible effect on oxidative stress levels was observed.

Materials and Structures (2023) 56:6  
<https://doi.org/10.1617/11527-022-02090-9>

ORIGINAL ARTICLE

## Does carbon footprint reduction impair mechanical properties and service life of concrete?

Kiran Ram · Marijana Serdar · Diana Londono-Zuluaga · Karen Scrivener

Received: 25 July 2022 / Accepted: 7 December 2022 / Published online: 29 December 2022  
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**Abstract** The aim of this study is to evaluate how much the changes in the concrete mix design, which enable carbon footprint reduction, are impacting mechanical properties and predicted service life of concrete structure. The starting point of this study was concrete mix used in a recent reinforced concrete experiment in the Adriatic. In the first round of Pelješac Bridge in the Adriatic. In the first round of experiments the amount of cement in this initial mix was significantly lowered, without jeopardising workability of the mix. In the second round, the main part of the cement was substituted with the combination of fly ash and limestone or calcined clay and limestone. All supplementary cementitious materials used were sourced in the region of the structure. The calcined

clays used in this study were found to have a higher mechanical strength and mechanical properties than the requested mechanical strength. The results indicate that the total cement content of the concrete mix designed, as all alternative mixes achieved a similar or higher sustainability index with lower amount of cement.

**Keywords** Low clinker cement · Chloride penetration · Service life · Environmental impact assessment · Sustainability

**1 Introduction**  
Concrete is known to be the most sought-after building material in the world. Among all other industries, the cement industry has a significant carbon footprint of about 8% [1]. Consequently, concrete has a significant impact on the environment due to the cement industry. Current projections indicate that by 2050,

APPLIED  
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## Synthesis of murunskite single crystals: A bridge between cuprates and pnictides

Davor Tolj<sup>a</sup>, Trpimir Ivšić<sup>b</sup>, Ivica Živković<sup>a</sup>, Konstantin Semeniuk<sup>b</sup>, Edoardo Martino<sup>b</sup>, Ana Akrap<sup>c</sup>, Priyanka Reddy<sup>d</sup>, Benjamin Klebel-Knobloch<sup>e</sup>, Ivor Lončarić<sup>f</sup>, László Forró<sup>b</sup>, Neven Barišić<sup>d,e</sup>, Denis K. Sunko<sup>d</sup>, Henrik M. Ronnow<sup>a</sup>

<https://doi.org/10.1016/j.apmt.2021.101096>

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79 scientific publications between 2019 and today – and more to come...



# Training courses

3 workshops in Switzerland, 1 in Croatia (not more because of COVID-19)

The result was not “training of Croatian colleagues” but an **exchange of knowledge** between Switzerland (SNF) and Croatia (HRZZ)

## Topics:

- AcademiaNet
- Bridge: interface of basic research and science-based innovation
- Data Management Plans
- Research Infrastructures
- Agora: dialogue between scientists and society
- Weave: supports excellent research projects
- SNSF Strategy
- National Centres for Competences in Research



# Impact

Somewhere I have read:

**“Objective is to strengthen the Croatian scientific competitiveness”**

This is not true:

**The scientific competitiveness has been strengthened in both countries through collaboration**

**Excellent output despite difficulties related to COVID-19 and the earthquake of 2020**

# What next ?

- Continued collaboration within and outside the Swiss-Croatian Research Program
- Tenure Track Pilot Programme (4 grants for a 5-year period)
- EUROSTARS (to provide assistance to Croatian small and medium-sized enterprises)
- Multilateral calls for Joint Research Projects (Poland, Hungary, Romania, Bulgaria, Croatia)

**The CSRP may be (is) a starting point for future research activities**

# Conclusion

The future is bright...

