



100 godina Fakulteta  
strojarstva i brodogradnje  
Sveučilišta u Zagrebu

100 Years of Faculty of  
Mechanical Engineering  
and Naval Architecture  
University of Zagreb



# Hydrogen in public transport

Matej Paranos

University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture

[matej.paranos@fsb.hr](mailto:matej.paranos@fsb.hr)

# H2LAB Group



H2 group leader

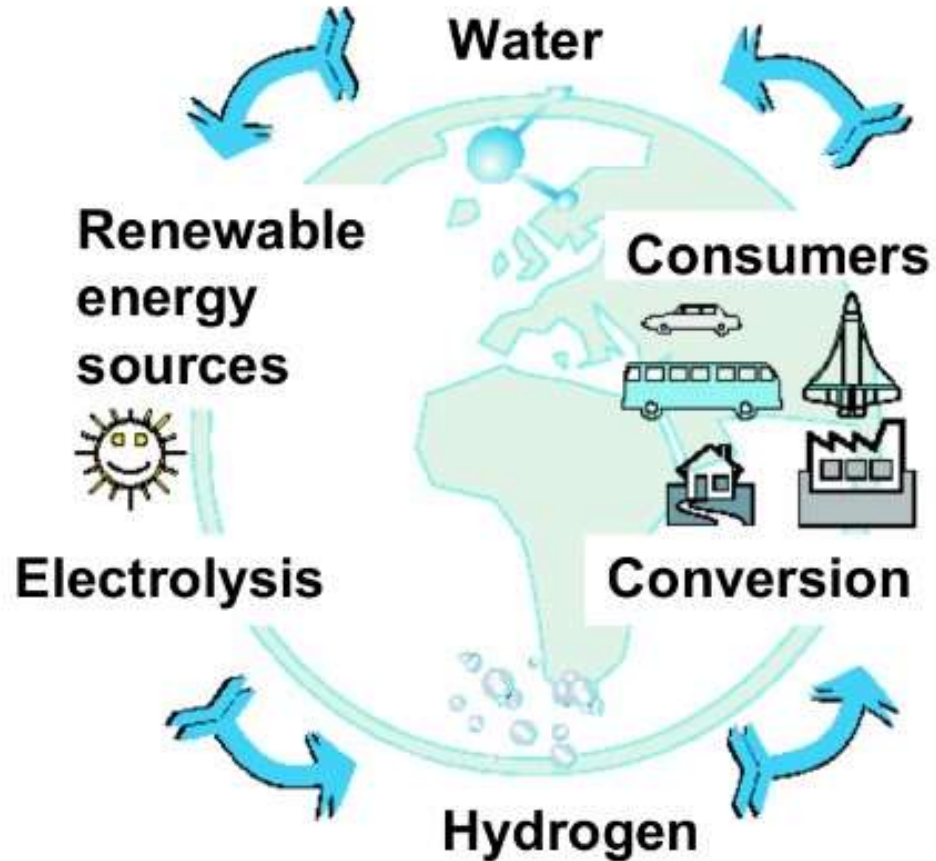
**Associate Professor Ankica Kovač, PhD**

PhD students

**Doria Marciuš, MSc ME**

**Matej Paranos, MSc ME** - Head of Power Engineering Laboratory, Faculty of Mechanical Engineering and Naval Architecture, Zagreb

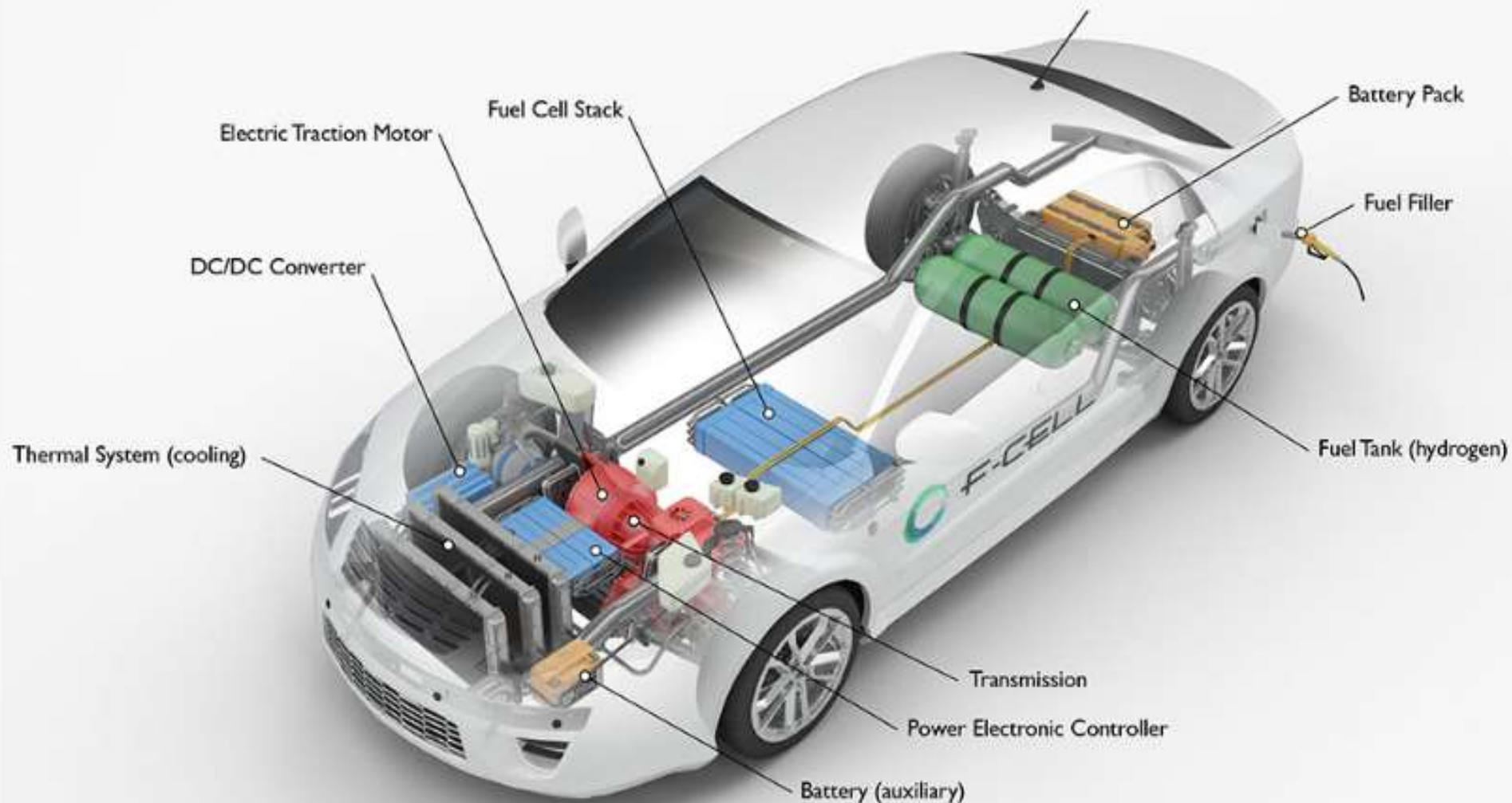
# Circle of hydrogen



- ✓ Hydrogen as clean as the energy sourced used for its production
- ✓ If used with RES, it is carbon neutral electrical storage
- ✓ Hydrogen is energy carrier
- ✓ Hydrogen is not energy source

# Hydrogen application

## Hydrogen Fuel Cell Vehicle





# Usage of hydrogen



- ✓ Hydrogen bikes
- ✓ Hydrogen cars
- ✓ Hydrogen trucks
- ✓ Hydrogen trains
- ✓ Hydrogen infrastructure

Alstom's hydrogen train Coradia iLint first successful run  
at 80 km/h

14/03/2017

**ALSTOM**





# First Croatian Hydrogen Powered Bicycle



International Journal of Hydrogen Energy

Volume 41, Issue 31, 17 August 2016, Pages 13820-13830



## Hydrogen transportation fuel in Croatia: Road map strategy

Mihajlo Firak, Ankica Đukić



International Journal of Hydrogen Energy

Volume 44, Issue 20, 19 April 2019, Pages 10014-10022



## Design of a solar hydrogen refuelling station following the development of the first Croatian fuel cell powered bicycle to boost hydrogen urban mobility

Ankica Kovač, Matej Paranos





# First Croatian Hydrogen Refuelling Station



International Journal of Hydrogen Energy

Volume 46, Issue 57, 18 August 2021, Pages 29400-29410



Thermal management of hydrogen refuelling  
station housing on an annual level

Ankica Kovač, Doria Marciuš, Matej Paranos





**Croatia Mirai Challenge  
(in cooperation with Toyota Croatia Inc.)**



# UrbanSTEM hydrogen bike





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