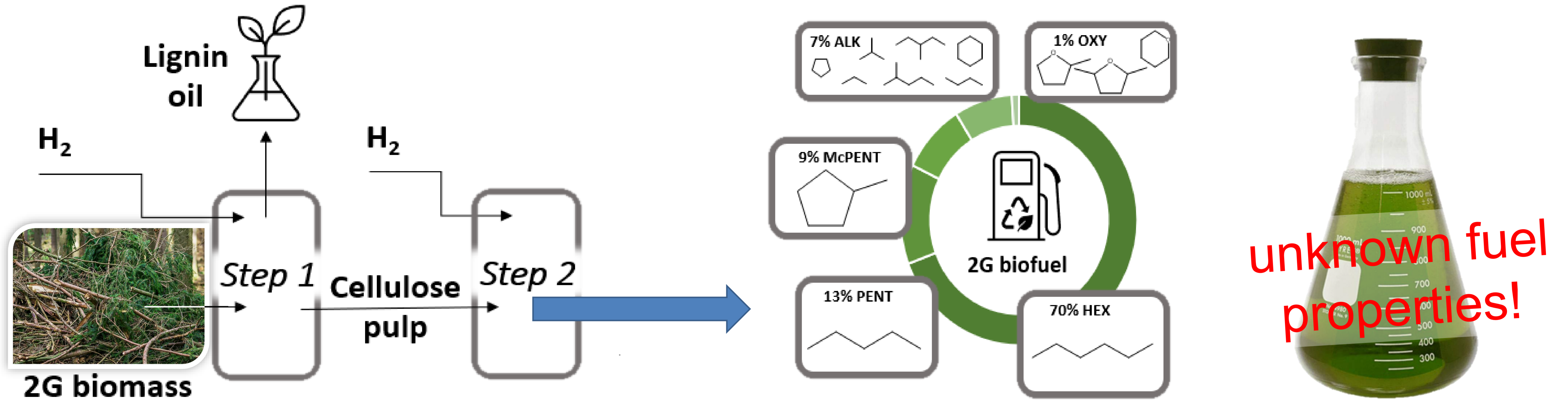


# A new biofuel from wood waste for sustainable transportation

ir Tom Robeyn, dr Tara Larsson, Prof Sebastian Verhelst

## New biofuel production process from wood waste (KULeuven)



## Problem & Goal Statement

- Combustion properties of individual fuel components known, but blend behavior unknown
- Blend behavior can be calculated with expensive computational resources
- A tool was developed to estimate fuel blend properties, based on literature and experimentally validated
- This enables fast-track (bio)fuel development, where completely new fuel blends properties are estimated and the promising ones are retained for laboratory verification or machine learning predictions

## Fuel Property Calculator

Select fuel components and vol fraction (600+ fuels available, up to 20 fuel components)

output:

Lower Heating Value, AFR, Energy Density

Volume specific CO<sub>2</sub>

Reid Vapor Pressure, Heat of Vaporization

Flash point

Component	1	2	3	4	5	6	7	8	
n-Hexane	0.100	0.600	0.300	0.000	0.000	0.000	0.000	0.000	
n-Dodecane	0.091	0.623	0.286	0.000	0.000	0.000	0.000	0.000	
2,2,4-Trimethylpentane	0.146	0.507	0.347	0.000	0.000	0.000	0.000	0.000	
Energy Fraction	0.09	1.22	0.00	0.00	0.00	0.00	0.00	0.00	
<b>Resulting:</b>									
Density (kg/m <sup>3</sup> )	721.50	44.00	138.59	14.99	0.00	0.00	38.32	38.49	1.06
LHV (MJ/kg, MJ/l)	44.00	31.75							
Molar mass (kg/Mol)									
Stoichiometric AFR									
Volumetric energy density (MJ/l)									
Volumetric CO <sub>2</sub> (kg/kg)									
Gravimetric CO <sub>2</sub> (kg/kg)									
RON									
MON									
Molar Ratio Products-Reactants									
Oxygen Content by mass in %	0.00	8.35	128.74				1648.63	74.916	20.97
HoV (kJ/kg)							73.409	23.44	55.55
Stoichiometric laminar flame speed (cm/s)							80.11	23.50	48.88
Heat capacity (J/kg·K)									
Dynamic viscosity (mPa·s)									
Surface tension (mNm)									
Cetane number (-)									
Lubricity (µm)									
Flash point (°C)	28.44								
VP at 25°C									
Ideal mix									
Non-ideal mix									
Molar linear									

output:

Blended RON & MON

Cetane Number

Lubricity

Heat Capacity

Laminar Flame Speed

## Ultimate goal: developing sustainable fuel for current & legacy vehicles

