

David Cannella CV

Personal Information

Family name, First name: **Cannella, David**
Researcher unique identifier Orcid:
0000-0002-0850-1278; Scopus ID: 37121464500
Date of birth: 21-07-1984
Nationality: Italian
URL for web site: <https://scholar.google.com/citations?hl=en&user=5WAXw7EAAAAJ>



Age: 34; I was offered my first position as assistant professor at the age of 32 at University of Copenhagen. Later, same year I moved to ULB same position. **Awards:** **Publications:** 18 (1 patent) since 2012. **Citations:** total = 968, h-index = 13 (source GoogleScholar). **Talks and seminars:** 15 delivered worldwide, *Gordon Research Conference-USA* invited speaker 2 times in 2013 and 2019, youngest speaker. **Supervision:** 4 postdocs (ongoing), 5 PhD students (2 ongoing) and 4 Master students. **Grand Total grants obtained:** >2 mln € last 5 years. **International mobility:** performed research in 6 countries.

CURRENT POSITION

Oct 2017 - **Assistant Professor** permanent, Universite Libre de Bruxelles, ULB, Belgium

EMPLOYMENT HISTORY

Jan-Oct2017 **Assistant Professor** at University of Copenhagen, UCPH, Denmark
2015 – 2016 **Senior scientist FTP grantee** Danish Research Council, CTBE-Brazil, Sapienza
2014 – 2015 **PostDoc** in applied biochemistry at Dong energy A/S biorefinery, Denmark
2010 – 2013 **PhD** fellowship at University of Copenhagen, Norden top programs, Denmark,
2009 – 2010 **Researcher** at Labor srl, Rome, Italy

EDUCATION

2014 **PhD** in Biochemistry of bioresources (UCPH, sc. supervisor Henning Jorgensen)
2010 **M.Sc.** in Industrial Biotechnology (Sapienza, Rome)
2008 **B.Sc.** in Biotechnology (Sapienza, Rome)

INTERNATIONAL COLLABORATION AND MOBILITY

Since 2012 I have authored and co-authored papers with more than 40 researchers worldwide, performed Science and lived in 6 different countries, speaking 4 languages.

2016-2017 Visiting researcher at Sapienza University of Rome, Italy

Study of plant immune response triggered by oligosaccharides treatment, at prof. Cervone's labs

Since 2014 to today several ongoing collaborations and long period visits in Brazil

- **Visiting researcher at CTBE-Campinas, Sao Paulo, Brazil**

Enzymatic degradation of sugarcane bagasse, scientific disseminations, supervision of PhD 2 students; with dr. Fabio Marcio Squina

2012 Visiting PhD at Chalmers University of Technology, Sweden, prof. Lisbeth Olsson

OBTAINED GRANTS period 2014-2019

2019 Bilateral project for international mobility Brazil-Belgium, **BILAT-FNRS 37k €**
2018 Starting grant **MIS-FNRS** by the Belgian national research council, **0.3 mln €**
2018 Multi-partners project RE4BRU by **Innoviris-Bridge, 1.1 mln €** (coordinator, 7 partners)

2018 Instruments starting grant for lab, **FER** by faculty of Science ULB, **0.12 mln €**
2016 Support for patent development granted by **UCPH**, used to hire 1PostDoc **0.15 mln €**
2014 Independent Postdoc granted by **DFF-FTP** Danish Research Council, **0.3 mln €**

Other relevant experience

- **PEER REVIEWER** for international scientific journals (Nature Catalysis, Green Chemistry, Biotech for Biofuels, Cellulose, Carbohydrate Polymers, Bioresource Technology among others)
- **SPEAKER** at 15 international meetings:
Gordon Research Seminar, USA 2013 on Cellulosome, Cellulase and other Carbohydrates Active enzymes; **and 2019 edition** (invited speaker).
SBFC Symposium on Biotech fuels and chemicals USA 2011-2017 (3 speeches, session chair);
Lignobiotech IV 2016 Madrid; V 2018 Helsinki (speaker+session chair);
Session chair at LPMO symposium 2016, Copenhagen
- **Organizing committee** 5th International Green Win conference Charleroi-2019
- **SUPERVISION**

Silvia Magri PhD student, ongoing
Hafez Jafari PhD student, co-supervisor ongoing
Marco Zarattini, PostDoc ongoing
Antonielle Monclaro, PostDoc ongoing
Marco Kadowaki, senior scientist ongoing
Mariana de Godoy, PostDoc volunteer ongoing
Livia Brenelli PhD student co-supervisor, UCPH 2016
Benedikt Moller PostDoc, UCPH 2016
Joao Franco Cairo PhD student, co-supervisor, UCPH 2016

Divulcation activity

My discovery of the light powered enzymatic degradation of cellulose and its potential application into the future bioeconomy often appeared in generalist newspapers: daily journals Politiken, Il fatto quotidiano, Il messaggero; scientific press Ingeniøren, Wired.it, Solar daily, Green Car Congress.

CAREER BREAKS

November 2016 – April 2017 **Paternity leave** 6 months

Resumé

I graduated in Industrial Biotechnology in 2010 at **University of Rome, Sapienza**. Continuing my academic work I participated at developing 2 European projects as researcher at Labor srl on olive oil wastewater treatment as biotransformation into bioplastic POLYVER FP6, and olive oil waste pomace into bioethanol ETOILE FP7. At the end of the same year I have been selected by Prof. Henning Jørgensen to carry a PhD study on cellulosic bio-ethanol production from agro and wood wastes at the faculty of Science, **University of Copenhagen (UCPH)**. During my PhD (ended in 2014) I have conducted experiments showing that the electrons could also be donated to LPMO from the lignin, a waste of the industrial lignocellulose pretreatment for bioethanol production. This opened the floor to the idea that fungi could use in some extends part of the plant cell wall to potentiate its degrading activity, using lignin to activate the LPMO against the plant itself. This theory sounded pioneering enough and therefore I have been granted the prestigious **independent postdoc by the**

Danish Research Council to study this “Electrons shuttling mechanism between plant and fungi”, and based in the prof. Claus Felby lab at UCPH. In this frame I came across with the idea of using the best electron donors system known in Nature composed by light+chlorophyll, and coupling it to LPMO. I discovered the photo-induced degradation of biomass the first time in April 2015, months later substantial evidences were provided so to make the manuscript acceptable for revision in Science; even though rejected, the reviewers provided constructive comments that once implemented could make it acceptable for *Nature Communication* in 2016.

In early 2017 I have been recognized a position as **assistant professor at UCPH**, and after a career brake of 6 months for paternity leave I spent a long stay visit at University of Rome Sapienza to study the physiological aspects of the Reverse Photosynthesis in Plants. In October 2017 the **Universite Libre de Bruxelles** offered me a permanent academic position starting as premiere assistant, choosing my line of research to create the new department of biomass transformation together with future other permanent academics. In 2018 together with prof. Amin Shavandi the Biomass Transformation Lab – BTL was granted regional Brussels fund in innovative technologies (Innoviris-Bridge for green Chemistry) **RE4BRU**, to explore direct application of photo-driven biomass catalysis. Also in 2018 personally I have been granted the **FNRS-MIS grant LUX** dedicated to young professors to start lab activities.

Relevant Publications

Consisting of **19 peer reviewed publications**. Below are listed the 5 most significant publications. The **H factor** is calculated to be **13** (google scholar) and **12** (Scopus), for a total of **860 citations** (excluding self-citation) **since 2012** year of my first publication.

[Light-driven oxidation of polysaccharides by photosynthetic pigments and a metalloenzyme](#)

D Cannella, KB Möllers, NU Frigaard, PE Jensen, MJ Bjerrum, K Joansen and C Felby
Nature Communications **2016**, 7, 11134; citations 38

Contributions **shared Corresponding and first author**: conceiving and discovery of the light driven mechanism.

Relevance: this paper is the major outcome of my **independent postdoc** founded by the **Danish Research Council, DFF**. Is the synthesis of 3 years of study on electrons shuttling among biological systems that have been always considered inert like lignin. This because we always omitted one crucial variable in the experiments: the LIGHT. It is now changing the way we always thought about lignocellulose degradation. Invited to be presented in 5 major conferences in the field, picked from 30+ news and scientific press worldwide. It also granted a patent application at the European patent office.

[Enzymatic cellulose oxidation is linked to lignin by long-range electron transfer](#)

B Westereng* and **D Cannella***, JW Agger, H Jørgensen, ML Andersen, VGH Eijsink, C Felby.

* Equal contribution first authorship

Scientific reports **2015**, 5, 18561. Citations 45.

Contribution **first author-shared**. Conceived and discovery of lignin as LPMO’s electrons donor.

Relevance: the work has been conducted during my PhD and later through the PostDoc, in collaboration with a more senior researcher and friend **Bjørge Westereng** pioneer of the LPMO enzymes from the Norwegian group at NMBU, led by **Vincent Hijsink**. This work set the basis for the discovery of the implication of phenols in biomass degradation published in **Science** the year later by D. Kracher *et al.*

[Production and effect of aldonic acids during enzymatic hydrolysis of lignocellulose at high dry matter content](#)

D Cannella, CH Chia-wen, C Felby, H Jørgensen

Biotechnology for biofuels **2012**, 5(1), 26; citations 120

Contribution: **Corresponding-first author:** Conceived and carried out the work to demonstrated the activity and impact of LPMOs inside modern commercial cellulolytic enzymatic cocktails.

Relevance: the first paper of its kind demonstrating the LPMO contribution, and activation with lignin during biomass degradation at high solids loading. This represent my **first paper from the PhD thesis**.

[Do new cellulolytic enzyme preparations affect the industrial strategies for high solids lignocellulosic ethanol production?](#)

D Cannella and H Jørgensen

Biotechnology and bioengineering **2014**, 111(1), 59-68; citations 87

Contribution first author: Conceived and carried the entire work.

Relevance: first of its kind this paper demonstrate the crucial role of a single enzyme (LPMO) able to impact also at industrial reactor design scale. It was demonstrated that saccharification of lignocellulose must occur aerobically (SHF) to achieve commercial yield of ethanol rather than anaerobically (SSF). Pilot plants designers have later confirmed these data worldwide (Dong-Inbicon, Beta-renewables, Novozymes, and more).

[Lignocellulose pretreatment technologies affect the level of enzymatic cellulose oxidation by LPMO](#)

UF Rodríguez-Zúñiga* and **David Cannella***, Roberto de Campos Giordano, Raquel de Lima Camargo Giordano, Henning Jørgensen, Claus Felby

* Equal contribution first authorship

Green Chemistry **2015**, 17(5), 2896-2903; citations 25

Contribution Corresponding and first author-shared: conceived the work while the experiments were carried out together with a more senior researcher invited in the lab UFR-Zuniga, from Fed. Uni. SaoCarlos, Brazil. The order of name in the author list it only reflects the seniority of the positions. Relevance: it shows how pretreatment technology for biomass could ultimately impact the role of lignin as electron donor to LPMO, thus finally impacting also the cellulose degradation performance of the enzymes.

Other relevant publications

[Laccase-derived lignin compounds boost cellulose oxidative enzymes AA9](#)

L Brenelli, FM. Squina, Cfelby, **David Cannella***

Biotechnology for Biofuels 2018

[Cyanobacterial biomass as carbohydrate and nutrient feedstock for bioethanol production by yeast fermentation](#)

KB Möllers, **D Cannella**, H Jørgensen, NU Frigaard

Biotechnology for biofuels 7 (1), 2014, 50 citations

[PEI detoxification of pretreated spruce for high solids ethanol fermentation](#)

D Cannella, PV Sveding, H Jørgensen

Applied energy 132, 394-40, 2014, 15 citations

[Obtaining nanofibers from curauá and sugarcane bagasse fibers using enzymatic hydrolysis followed by sonication](#)

Adriana de Campos, Ana Carolina Correa, **David Cannella**, Eliangela de M Teixeira, Jose M Marconcini, Alain Dufresne, Luiz HC Mattoso, Pierre Cassland, Anand R Sanadi
Cellulose, 20 (3) 36 citations

Patent

Light-driven system and methods for chemical modification of an organic substrate.

PATENT application number PCT/EP2016/066804 at European patent office 2015.

Principal author and paternity of the patent.

The University of Copenhagen that hold the patent's right, have granted 1 year (2016) of PostDoc salary plus consumables (0.15 Million Euros), for consolidating the data set to be contribute to the patent application.

Bruxelles,

01/01/2020

Assistant prof. David Cannella

PhotoBioCatalysis unit

CoHead of Biomass Transformation Lab - BTL

Crop Nutrition and Biostimulation Lab - CPBL

EIB, Université Libre de Bruxelles - ULB

