Dr. Benjamin CRESSIOT
DOB: 23/12/1985
Address: CY Cergy Paris, Laboratoire LAMBE,
2 Avenue Adolphe Chauvin, 95300 Pontoise
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Actual situation

Associate Professor
Teaching: Biology department, CY Cergy Paris University
Research: Laboratoire Analyse et Modélisation pour la Biologie et l'Environnement (LAMBE), CY Cergy Paris University, Evry Paris-Saclay University, UMR8587 CNRS.

Education

2025: **HDR in life sciences (CNU 64)**, CY Cergy Paris University, France.

2009-2012: **Biophysics PhD**, University of Evry Paris-Saclay, France.

2008-2009: **Master 2** in Cellular and Molecular Biology, University of Cergy-Pontoise, France

2007-2008: **Master 1** in Biotechnology and Biomedicine, University of Alicante, Spain, Erasmus program

2003-2007: **Licence** in Biology, University of Cergy-Pontoise, France

Scientific Experience

From 09/2019: **Associate professor** (CNU 64) at CY Cergy Paris University, LAMBE laboratory (CNRS UMR 8587).

06/2018 to 09/2019: **Full-time Postdoctoral position** at the LAMBE laboratory (CNRS UMR 8587), Single-molecule electrical detection and measurement of biomarkers from human samples using nanopores, University of Evry, France.

09/2015 to 05/2018: **Full-time Postdoctoral position** in Meni Wanunu's laboratory, Electrical characterization of a portal protein chemically modified for insertion into planar lipid bilayers and fabrication of hybrid nanopores, Northeastern University, MA, USA.

10/2012 to 08/2015: **Full-time Postdoctoral position** in Patricia L. Clark's laboratory, Dynamics of transport of an autotransporter through an aerolysin nanopore, University of Notre Dame, IN, USA.

09/2009 to 09/2012: **Full-time Biophysics PhD** at the LAMBE laboratory (CNRS UMR 8587), Protein folding and study through protein and solid-state nanopores at the single molecule level, University of Evry, France.

Scientific Production

Number of publications in peer-reviewed journals: 23
Number of books or book chapters: 1
Number of publications in peer-reviewed conference proceedings: 12

Number of invited lectures at international conferences: 6
Number of patents: 2

Publications in peer-reviewed journals

23. Meyer N., Ratinho L., Greive S., Bacri L., Morozzo della Rocca B., Chinappi M., Pelta J. and **Cressiot B.***
Discrimination of oxytocin, a behavioral neuropeptide hormone, and its structural variants by nanopore.
ACS Nano, **2025.**
22. Iesu L., Sai M., Torbeev V., Kieffer B.*, Pelta J.* and **Cressiot B.***
Single-molecule nanopore sensing of proline cis/trans amide isomers.
RSC Chemical Science, **2025**.
21. Ratinho L., Meyer N., Greive S., **Cressiot B.*** and Pelta J.*
Nanopore sensing of protein and peptide conformation for point-of-care applications.
Nature Communications, **2025**.
20. Ratinho L., Bacri L., Thiebot B.*, **Cressiot B.*** and Pelta J.*
Identification and Detection of a Peptide Biomarker and Its Enantiomer by Nanopore.
ACS Central Science, **2024**.
19. Greive S., Bacri L., **Cressiot B.*** and Pelta J.*
Identification of Conformational Variants for Bradykinin Biomarker Peptides from a Biofluid Using a Nanopore and Machine Learning.
ACS Nano, **2023.**
18. Stierlen A., Greive S., Bacri L., Manivet P., **Cressiot B.*** and Pelta J.*
Nanopore discrimination of coagulation biomarker derivatives and characterization of a post-translational modification.
ACS Central Science, **2023**.
17. Chowdhury T., **Cressiot B.**, Parisi C., Smolyakov G., Thiebot B., Trichet L., Fernandes F. M., Pelta J., and Manivet P.
Circulating Tumor Cells in Cancer Diagnostics and Prognostics by Single-Molecule and Single-Cell Characterization.
ACS sensors, **2023**.
16. Tanimoto I., Zhang J., **Cressiot B.**, Le Pioufle B., Bacri L., and Pelta J.
Dynamics of DNA Through Solid-state Nanopores Fabricated by Controlled Dielectric Breakdown.
Chemistry an Asian Journal, **2022**.
15. Tanimoto I., **Cressiot B.**, Greive S., Le Pioufle B., Bacri L., and Pelta J.
Focus on using nanopore technology for societal health, environmental, and energy challenges.
Nano Research, **2022**.
14. **Cressiot B.** and Pelta J.
Fast Decoding of the First Steps of Protein Aggregation Using a Nanopipette.
ACS Central Science, **2022**.
13. Tanimoto I., **Cressiot B.**, Jarroux N., Roman J., Patriarche G., Le Pioufle B., Pelta J., and Bacri L.
Selective target protein detection using a decorated nanopore into a microfluidic device.
Biosensors and Bioelectronics, **2021**.
12. **Cressiot B**., Bacri L., and Pelta J.
The promise of nanopore technology: Advances in the discrimination of protein sequences and chemical modifications.
Small Methods, **2020**.
11. Bétermier F., **Cressiot B.**, Di Muccio G., Jarroux N., Bacri L., Morozzo della Rocca B., Chinappi M., Pelta J. and Tarascon J. M.
Single-sulfur atom discrimination of polysulfides with a protein nanopore for improved batteries.

Communications Materials, **2020**.

10. **Cressiot B.**, Ouldali H., Pastoriza-Gallego M., Bacri L., Van der Goot G. and Pelta J.
Aerolysin, a powerful protein sensor for fundamental studies and development of upcoming applications.
ACS sensors, **2019**.
9. **Cressiot B.**, Greive S., Mojtabavi M., Antson A., and Wanunu M.
Thermostable virus portal proteins as reprogrammable adapters for solid-state nanopore sensors.
Nature Communications, **2018**.
8. Hu R., Rodrigues J., Waduge P., Yamazaki H., **Cressiot B.**, Chishti Y., Makowski L., Yu D., Shakhnovich E., Zhao Q., and Wanunu M.
Differential enzyme flexibility probed using solid-state nanopores.
ACS Nano, **2018**.
7. **Cressiot B**., Greive S., Si W., Pascoa T., Mojtabavi M., Chechik M., Jenkins H., Lu X., Zhang K., Aksimentiev A., Antson A., and Wanunu M.
Porphyrin-assisted docking of a thermophage portal protein into lipid bilayers: nanopore engineering and characterization.
ACS Nano, **2017**.
6. Waduge P., Hu R., Bandarkar P., Yamazaki H., **Cressiot B.**, Zhao Q., Whitford P., and Wanunu M.
Nanopore-based measurements of protein size, fluctuations, and conformational changes.
ACS Nano, **2017**.
5. **Cressiot B.**, Braselmann E., Oukhaled A., Elcock A., Pelta J., and Clark P.L.
Dynamics and energy contributions for transport of unfolded pertactin through a protein nanopore.
ACS Nano, **2015**.
4. **Cressiot B.**, Oukhaled A., Bacri L., and Pelta J.
Focus on protein unfolding through nanopores.
BioNanoScience, **2014**.
3. **Cressiot B.**, Oukhaled A., Patriarche G., Pastoriza-Gallego M., Betton J.M., Auvray L., Muthukumar M., Bacri L., and Pelta J.
Protein transport through a narrow solid-state nanopore at high voltage: experiments and theory.
ACS Nano, **2012**.
2. Merstorf C., **Cressiot B.**, Pastoriza-Gallego M., Oukhaled A., Betton J.M., Auvray L., and Pelta J.
Wild-type, mutant protein unfolding and phase transition detected by single-nanopore recording.
ACS Chemical Biology, **2012**.
1. Oukhaled A., **Cressiot B.**, Bacri L., Pastoriza-Gallego M., Betton J.M., Bourhis E., Jede R., Gierak J., Auvray L., and Pelta J.
Dynamics of completely unfolded and native proteins through solid-state nanopores as a function of electric driving force.
ACS Nano, **2011**.

Books or book chapters

1. Merstorf M., **Cressiot B.**, Pastoriza-Gallego M., Oukhaled A., Bacri L., Gierak J., Pelta J., Auvray L., Mathé J.
DNA unzipping and protein unfolding using nanopores.
Nanopore-Based Technology. Methods in Molecular Biology, vol 870. Humana Press, **2012.**

Publications in peer-reviewed conference proceedings

13. **Peptide biomarker discrimination and identification: From sequence to conformational dynamics using nanopores**. Laura R Ratinho, Nathan Meyer, Sandra J Greive, Bénédicte Thiebot, Laurent Bacri, Juan Pelta, **Benjamin Cressiot.**

Biophysical Journal, Volume 124, Issue 3, 501a.
02/2025

12. **Conformational studies on peptides: Unveiling the proline isomer ratio by single-molecule nanopore sensing**. Luca Iesu, Mariam Sai, Vladimir Torbeev, Bruno Kieffer, Juan Pelta, **Benjamin Cressiot.**
Biophysical Journal, Volume 124, Issue 3, 499a.
02/2025
11. **Dynamics and structural studies of a neutral peptide biomarker and its analog with a nanopore aerolysin WT and mutants**. Nathan Meyer, Laura Ratinho, Sandra J Greive, Bénédicte Thiebot, Juan Pelta, **Benjamin Cressiot**.
Biophysical Journal, Volume 124, Issue 3, 499a.
02/2025
10. **Cryo-EM structure and stability of a novel thermophage portal protein**. Peter Chong, Maria Chechik, Sandra Greive, **Benjamin Cressiot**, Fred Antson
Biophysical Journal, Volume 123, Issue 3, 51a - 52a.
02/2024
9. **Peptide biomarker enantiomer discrimination and identification of a biomarker family by nanopore in a complex biofluid**. Laura R Ratinho, Sandra J Greive, Bénédicte Thiebot, Laurent Bacri, Juan Pelta, **Benjamin Cressiot.**
Biophysical Journal, Volume 123, Issue 3, 145a.
02/2024
8. **Nanopore discrimination of coagulation biomarker derivatives and characterization of a post-translational modification. Benjamin Cressiot,** Aicha Stierlen, Sandra J Greive, Laurent Bacri, Philippe Manivet, Juan Pelta.
Biophysical Journal, Volume 122, Issue 3, 156a**.**
02/2023
7. **Nanoparticle detection by solid-state nanopore integrated into a reusable microfluidic device.** Izadora Mayumi Fujinami Tanimoto, **Benjamin Cressiot**, Jean Roman, Nathalie Jarroux, Gilles Patriarche, Bruno Le Pioufle, Juan Pelta, Laurent Bacri.
MicroTAS
10/2020
6. **Single Protein Trapping on Ultrathin Asymmetric Solid-State Nanopores.** Hirohito Yamazaki, Fanjun Li, Abdelkrim Benabbas, Benjamin Cressiot, Paul M Champion, Min Chen, Meni Wanunu.
Biophysical Journal, Volume 118, Issue 3, 156a - 157a.
02/2020
5. **Stable Hybrid Nanopores for Biomolecule Sensing.** Mehrnaz Mojtabavi, Sandra Greive, **Benjamin Cressiot**, Xinqi Kang, Alfred Anston, Meni Wanunu.
Biophysical Journal, Volume 116, Issue 3, 579a.
02/2019
4. **Porphyrin-Assisted Docking of a Thermophage Portal Protein into Lipid Bilayers: Nanopore Engineering and Characterization. Benjamin Cressiot**, Sandra Greive, Wei Si, Tomas Pascoa, Mehrnaz Mojtabavi, Maria Chechik, Huw Jenkins, Xueguang Lu, Ke Zhang, Aleksei Aksimentiev, Fred Antson, Meni Wanunu.
Biophysical Journal, Volume 114, Issue 3, 686a.
02/2018
3. **Ergodicity Measurements in Native Protein Ensembles using Solid-State Nanopores.** Pradeep Waduge, Rui Hu, Prasad Bandarkar, **Benjamin Cressiot**, Paul Whitford, Meni Wanunu.
Biophysical Journal, Volume 112, Issue 3, 190a.
02/2017

2. **Dynamics and energy contributions for transport of pertactin through an aerolysin nanopore.** **Benjamin Cressiot**, Esther Braselmann, Abdelghani Oukhaled, Juan Pelta, Patricia L Clark.
Biophysical Journal, Volume 108, Issue 2, 481a.
01/2015

1. **FIB direct fabrication of sub-10 nm synthetic nanopores.** Jacques Gierak, Ali Madouri, Eric Bourhis, Jean-Yves Marzin, Ghani Oukhaled, Laurent Bacri, **Benjamin Cressiot**, Juan Pelta, Ralf Jede, Lars Bruchhaus, Loïc Auvray.
APS March Meeting Abstract.
03/2011

Invited lectures at international conferences

6. Biomarker detection and conformational sensing using nanopores. **Benjamin Cressiot.**
6th International Conference on Biomedical Engineering and Bioinformatics for Health, Xi'an (China, online),
07/2025, **Guest lecture**
5. Protein analysis by nanopores, from long polypeptides to peptides. **Benjamin Cressiot.**
2024 Nanopore Electrochemistry Meeting, Nanjing (China),
12/2024, **Guest lecture**
4. Nanopore discrimination of coagulation biomarker derivatives and characterization of a post-translational modification. **Benjamin Cressiot.**
International Conference on Innovative Therapeutic Solutions (France, online).
07/2023, **Guest lecture**
3. Nanopore discrimination of coagulation biomarker derivatives and characterization of a post-translational modification. **Benjamin Cressiot.**
Nanofluidics in Physics and Biology 2023, Lyon (France).
07/2023, **Guest lecture**
2. Single-sulfur resolution polysulfide sensing: first steps in nanopores as battery sensors. **Benjamin Cressiot.**
Journées de la matière condensée, Rennes (France, online).
08/2021, **Guest lecture**
1. Single-sulfur resolution polysulfide sensing: first steps in nanopores as battery sensors. **Benjamin Cressiot.**
Nanopore electrochemistry meeting, Nanjing University, (China, online).
10/2020, **Guest lecture**

Oral communications and posters

14. **Nanopores for the detection of biomarkers toward early diagnosis**
CY Cergy Paris University, Nanopore Meeting (France)
06/2025, oral communication
13. **Nanopores for the detection of biomarkers toward early diagnosis**
Nanjing University (China)
04/2025, oral communication
12. **Detection of peptide biomarkers using aerolysin**.
Zhejiang Sci-Tech University (China)
12/2024, oral communication

11. **Detection of peptide biomarkers using aerolysin**.

Shanghai Normal University (China)
06/2024, oral communication

10. **Nanopore discrimination of coagulation biomarker derivatives and characterization of a post-translational modification**.
Biophysical Society 67th annual meeting, San Diego, CA (USA)
02/2023, oral communication
9. **Porphyrin-assisted docking of a thermophage portal protein into lipid bilayers: nanopore engineering and characterization**.
Biophysical Society 62nd annual meeting, Baltimore, MD (USA)
02/2018, poster presentation
8. **Dynamics and energy contributions for transport of pertactin through an aerolysin nanopore**
Biophysical Society 59th annual meeting, Baltimore, MD (USA)
02/2015, poster presentation
7. **Dynamics and energy contributions for transport of pertactin through an aerolysin nanopore**.
28th annual Gibbs conference on biothermodynamics, Carbondale, IL (USA)
09/2014, oral communication
6. **Protein and solid-state nanopores as molecular sensors of protein conformation.**
18th Annual Midwest Stress Response and Molecular Chaperone Meeting, Chicago, IL (USA)
01/2013, oral communication
5. **Solid-state nanopores for biomolecule detection**.
Nanopore workshop "Controlled molecular sensing using Nanopores", Imperial College, London (Royaume-Uni)
12/2011, poster presentation
4. **Understanding the protein transport through solid-state nanopores: folding perspectives.**
BIT' s 2nd Annual World Congress of NanoMedicine-2011, Shenzen (Chine)
11/20211, oral communication
3. **Solid-state nanopores as a molecular sensor for protein conformations.**
Nanofluidics in Biology, Heraeus Workshop, Jacobs University Bremen, Bremen (Germany)
06/2011, oral communication
2. **Transport of native or completely unfolded proteins through a solid-state nanopore at the single-molecule level.**
Congrès ICNP 2010, Kottayam (Inde)
09/2010, oral communication
1. **Transport of native or completely unfolded proteins through a solid-state nanopore at the single-molecule level.**
Summer school “Biosensing with channels”, Berder (France)
08/2010, oral communication

Patents

2. ***Méthode de détection de biomarqueurs peptidiques***. Juan Pelta, **Benjamin Cressiot**, Philippe Manivet, Sandra Greive.
Patent N°: 11002657
1. ***Lipid-free anchoring of thermophilic bacteriophage G20C portal adapter into solid-state nanopores***.
Meni Wanunu, Alfred Antson, Sandra Greive, **Benjamin Cressiot**. *Patent N°:* US11933778B2

Research grants

8. **Investissements d’Avenir, CY Générations**, programme Horizon.
187.8 k€, 2025 to 2029.

7. **ANR JCJC** « QuaBioNHy » (ANR-23-CE44-0013),
   359 k€, 09/2023 to 03/2027.
6. **1/2 allocation de thèse AID Classique DGA et 1/2 allocation de thèse de l'ED** « Sciences et Ingénierie » de CY Cergy Paris Université,
   125 k€, 09/2023 to 08/2026.
5. **Investissements d'Avenir ANR-16-IDEX-008, CY Initiative of Excellence**, programme Emergence,
   30 k€, 09/2021 to 08/2023.
4. **1/2 allocation postdoctorale DIM Respore et 1/2 allocation postdoctorale RS2E**,
   100 k€, 2021.
3. **Financement équipement DIM Respore**,
   34 k€, 2020.
2. **Allocation post-doctorale de retour GENOPOLE**, LAMBE laboratory,
   135 k€, 2019 to 2021.
1. **Royal Society E-GAP2, International Exchanges Scheme** - 2015/R3, Northeastern University (USA), Meni Wanunu laboratory, and University of York (UK), Fred Antson laboratory,
   6 k£, 2016 to 2017.

Doctoral and scientific supervision

7. **Luca Iesu, Ph.D.**, began his thesis in January 2024, titled "Detection and Quantification of Peptic Biomarkers by Hybrid Nanopores."
   The thesis is co-supervised by Professor Juan Pelta (50%) and me (50%).

6. **Laura Ratinho, Ph.D.**, began her thesis in October 2023, on "Electrical Detection of Protein Biomarkers in Biological Fluids of Single-Molecule Head Trauma by Nanopores".
   The thesis is co-supervised by Professor Juan Pelta (50%) and me (50%).

5. **Dr. Nathan Meyer, postdoctoral position** from October 2023 to November 2024, on "Discrimination of oxytocin, a behavioral neuropeptide hormone, and its structural variants by nanopore".
   I fully supervised his work (100%)

4. **Laura Ratinho, M2,** from January to July 2022, on "Étude de la dynamique et de conformations de peptides à travers un nanopore d'aerolysine ».
   I fully supervised her work (100%)

3. **Aïcha Stierlen, M2**, from January to July 2022, on "Nanopore discrimination of coagulation biomarker derivatives and characterization of a post-translational modification".
   I fully supervised his work (100%)

2. **Habibullah Moradian, M2**, from January to July 2022, on "Detection of a biomarker peptide by nanopore".
   I fully supervised his work (100%)

1. **Doryan Masmoudi, M1**, from January to July 2021, on "Detection of a hormonal biomarker peptide by nanopore"
   I fully supervised his work (100%)

Teaching assignments

Since my recruitment in September 2019, I have taught a total of 892 HETDs, averaging **223 HETDs/year**. My primary teaching focuses on biochemistry, cellular and molecular biology. Following my recruitment, I have been responsible for creating various courses presented below.

Year	Level	Type of teaching	Average hours per year	Subject of teaching
2019-2025	L1	CM	48 HETD	Cell Biology, fundamentals in life and health sciences
2019-2025	L1	TD	14 HETD	Cell Biology, fundamentals in life and health sciences
2019-2023	L1	TD	27 HETD	Basic genetics
2019-2025	Pre-Ingénieur 1	CM	48 HETD	Cell Biology, fundamentals in life and health sciences
2019-2025	Pre-Ingénieur 1	TD	14 HETD	Cell Biology, fundamentals in life and health sciences
2019-2023	L2	TD	26 HETD	Protein biochemistry
2019-2023	L2	TD	9 HETD	Enzymology and molecular biology techniques
2019-2025	L2	CM	9 HETD	Protein maturation, structure and function
2019-2023	L2	TD	12 HETD	Protein maturation, structure and function
2019-2025	L2	TP	20 HETD	Experimental methods in biology
2019-2023	Pre-Ingénieur 2	TD	26 HETD	Protein biochemistry
		CM	18 HETD	

2019-2025	Pre-Ingénieur 2			Enzymology and molecular biology techniques
2019-2025	Pre-Ingénieur 2	CM	5 HETD	Protein maturation, structure and function
2019-2025	Pre-Ingénieur 2	TP	20 HETD	Experimental methods in biology
2019-2023	L3	TD	18 HETD	Regulation of gene expression

Administrative duties

Since 2019: **Elected member of the Biology Department Council** (From 2019 to 2023 and 2025 to the present).

Since 2019: **Safety Health Officer** of the LAMBE laboratory on the CY Cergy Paris site.

Since 2025: **RIPEC C3 expertise** in local for CY Cergy Paris University.