

GUILHEM CHAUBET [gijɛm ʃɔbe]

CHARGÉ DE RECHERCHE CNRS • HDR

CO-HEAD OF THE BIOFUNCTIONAL CHEMISTRY TEAM (UMR7199)

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Born on July 11th, 1986, in Avignon, France • Married, two daughters

🌐 <https://cbst.unistra.fr/equipes/chimie-biofonctionnelle> • 🐦 @BFC_UMR7199

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EDUCATION

2014-2017 **Postdoctoral Research Assistant** • Adviser: Prof. Edward A. Anderson University of Oxford, Oxford, United-Kingdom

2010-2013 **PhD** • Supervisors: Prof. Jean Martinez & Dr Isabelle Parrot
University of Montpellier 2, Montpellier, France

2008-2010 **Master's degree** • Engineering of Biomolecules
University of Montpellier 2, Montpellier, France

2005-2008 **Bachelor's degree** • Biochemistry & Life Sciences
University of Avignon, Avignon, France

ACADEMIC POSITIONS

11th Dec. 2020 **Habilitation à Diriger des Recherches** • "New Strategies in Native Proteins Bioconjugation and In-Vivo Chemistry"
University of Strasbourg, Strasbourg, France

Jury: Dr Sandrine Sagan, Prof. Christian Hackenberger, Dr Didier Boturyn, Dr Sarah Cianferani, Prof. Jérôme Waser

Jan. 2017 - CNRS – Faculty of Pharmacy of Strasbourg, Strasbourg, France
Chargé de Recherche Classe Normale • Section 16

RESEARCH EXPERIENCE

2017 - **Research in chemical conjugation of proteins**, focusing on site-selective strategies using multicomponent reactions and new families of reagents. **Research in chemical biology:** development of new families of cleavable linkers for antibody-drug conjugates applications, work in bioorthogonal chemistry and in late-stage modification of bioactive substances.

2014-2017 *Postdoctoral studies in the Ed. Anderson group.* **Total synthesis** of the natural product rubriflorldilactone A: multi-step synthetic routes, with a key palladium-catalysed polycyclisation to build the core CDE-rings of the targeted compound.
Development of a new palladium-catalysed synthesis of furans from alkynyl epoxides. Work conducted as a Marie Skłodowska-Curie fellow (grant agreement #656012).

2010-2013 *PhD thesis in the Martinez group*, entitled « New ring contraction reactions: tools for the construction of organised edifices ». Use of α -amino acids as chiral building blocks to access **foldamers** via multistep synthetic routes relying on key ring-contraction reactions.

2008-2010 *Internships in the Martinez and Perigaud groups.* New **tandem reactions** toward 2-amino-1,3-thiazoles scaffolds; synthesis of 1',4'-dimethyladenosine **nucleosides**.

AWARDS/PRIZES

2024	CNRS Bronze Medal
2023	Young Researcher Award from the Chemical Biology Group of the French Chemical Society
2021	Prime d'encadrement doctoral et de recherche , CNRS
2014	French Chemical Society prize for best PhD in chemistry in the Languedoc-Roussillon region.

FUNDING/FELLOWSHIPS

2023	<ul style="list-style-type: none">♦ SATT Conectus • Maturation • <u>Coordinator</u> "Multicomponent Synthetic Conjugation" • 692 k€♦ Agence Nationale de la Recherche • AAPG • Partner "Towards improved cross-linking mass spectrometry methods to decipher protein-nucleic acid interactions" • 695 k€♦ SATT Conectus • Pre-maturation • <u>Coordinator</u> "Multicomponent Synthetic Conjugation" (I23-008/01) • 48 k€♦ Emergence@international • CNRS • 5 k€
2021	<ul style="list-style-type: none">♦ Agence Nationale de la Recherche • AAPG • Partner "Targeting A_{2A} receptor in autism: single domain antibodies for direct inhibition or antagonist vectorization" • 504 k€
2020	<ul style="list-style-type: none">♦ Innovative Training Networks • European Union / Marie Skłodowska-Curie Actions • <u>Coordinator</u> "Targeted Anti-Cancer Therapies" (TACT, grant agreement #859458) • 3.2 M€
2019	<ul style="list-style-type: none">♦ Agence Nationale de la Recherche • AAPG • Partner "Structural Insights into PRMT Complexes: Deciphering Regulation of Arginine Methylation by Protein Arginine Methyltransferases" • 551 k€♦ Agence Nationale de la Recherche • JCJC • <u>Coordinator</u> "Ugi Reaction for the Site-Specific Bioconjugation of Native Proteins" • 244 k€
2018	<ul style="list-style-type: none">♦ Région Grand-Est • <u>Coordinator</u> "New tools for the bioconjugation of native proteins" • 20 k€♦ IDEX Attractivité • <u>Coordinator</u> "Réaction d'Ugi pour la Bioconjugaison Site-Spécifique de Protéines Natives " • 40 k€
2017	<ul style="list-style-type: none">♦ Région Grand-Est / LabEx Medalis • <u>Coordinator</u> "Nouvelles méthodes de bioconjugaison : vers le marquage site-spécifique de protéines natives" • 100 k€

TEACHING & SUPERVISION

2023-	"Introduction to Biology" • 10.5-hour course to last-year Master's and engineering school students at 'École européenne de chimie, polymères et matériaux de Strasbourg' (ECPM) – University of Strasbourg
2017-	Supervised 11 PhD students (including 6 as their main supervisor), 3 postdoctoral researchers, 5 Master's 2 students and >10 undergraduates.
2010-2013	Instructor of Bachelors' students • Teaching general organic chemistry, both practical work and tutorials; 64 hours per year, 192 hours in total Université de Montpellier 2

MANAGEMENT & ADMINISTRATION

2024 -	<ul style="list-style-type: none">♦ Member of the board of the doctoral school – <i>Conseil de l'école doctorale</i> – 'Chemical Sciences' (ED 222), Strasbourg, France♦ Member of the committee of the doctoral school – <i>Bureau de l'école doctorale</i> – 'Chemical Sciences' (ED 222), Strasbourg, France
2021 -	<ul style="list-style-type: none">♦ Co-Head of the Biofunctional Chemistry team, UMR 7199, Strasbourg, France♦ Member of the laboratory council of UMR 7199, Strasbourg, France♦ Member of the steering committee of UMR 7199, Strasbourg, France
2019-2023	Member of the thesis commission – <i>Commission des thèses</i> – of the doctoral school 'Chemical Sciences' (ED 222), Strasbourg, France
2019 -	Member of the jury awarding doctoral contracts of the ED 222
2018 -	IT manager of UMR 7199, Strasbourg, France

CONFERENCE ORGANISATION & OUTREACH

2024	<ul style="list-style-type: none">♦ Organisation of the exhibition "Theses & Parenthesis" at the <i>Palais Universitaire of Strasbourg</i>, dedicated to the presentation of the graphic novel and the animated movies created during the ITN project I coordinated.♦ Participation to the festival "Pint of Science" in Strasbourg
2020-2024	Organisation of consortium meetings and training activities for the eleven students of our ITN programme (TACT) • one meeting in Strasbourg (one week; main organiser; 30 participants); two in Heidelberg & Belfast (one week each, co-organiser; 20 participants).

INVITED SPEAKER

2024	<ul style="list-style-type: none">♦ Journées SCF Alsace, Strasbourg – 8th March♦ Laboratoire de Bioimagerie et Pathologies, Strasbourg – 18th June♦ CEA Paris-Saclay, Gif-sur-Yvette – 10th September
2023	<ul style="list-style-type: none">♦ Minakem, online – 16th June♦ Congrès SCF 2023, Nantes – 27th June♦ Institut de cancérologie Strasbourg Europe (ICANS), Strasbourg – 7th July
2022	<ul style="list-style-type: none">♦ Laboratoire d'Innovation Thérapeutique (LIT), Strasbourg – 11th January♦ Institut de Chimie Moléculaire Université de Bourgogne (ICMUB), Dijon – 29th April♦ Second Young Investigator Workshop of the EuChemS, Lisbon – 1st September
2021	RSC Chemical Biology & Bio-Organic Group Forum , online – 8 th January

REVIEWING ACTIVITY

2023	<ul style="list-style-type: none">♦ Examiner of two PhD theses • University of Strasbourg♦ External expert • scientific evaluation of application files submitted to the Dutch Research Council (NOW), Netherlands, and to the University of Grenoble Alpes in a call for thesis projects.
2022	<ul style="list-style-type: none">♦ External expert • scientific evaluation of application files submitted in the call "CY Initiative of Excellence" of the University of Cergy Paris, France♦ Member of thesis committees of 4 different PhD students • 3 at the University of Strasbourg, 1 at the University of Burgundy
2021	Member of the thematic institute "Health Technologies" of the French National Alliance for Life Sciences and Health (AVIESAN)
2019	External expert • scientific evaluation of application files submitted in the call "Dynamics in research" of the University of Paris, France
2018-2022	Jury member of the oral examination of Master's students, University of Strasbourg, France
2018 -	Reviewer for scientific journals • Nature Chemistry, Nature Communications, ChemBioChem, ChemistryOpen, Helvetica Chimica Acta, Organic & Biomolecular Chemistry, Pharmaceutics, RSC Advances, Synlett.

PATENTS

"Preparation of Protein Conjugates via Multicomponent Ugi Reaction" L. Turelli, A. Wagner, G. Chaubet, EP23307065.5, filed on 28 November 2023.

PUBLICATIONS

IN PEER-REVIEWED JOURNALS

- #1 "Retinoids Molecular Probes by Late-stage Azide Insertion - Functional Tools to Decrypt Retinoid Metabolism"** J. Coullery, A. Kindler, M. Rima, H. Cahuzac, N. Rochel, G. Chaubet, W. Krezel*, A. Wagner*, *ChemBioChem*, 2024, e202300689
- #2 "Chemical Production of Cytotoxic Bispecific Antibodies Using the Ugi Multicomponent Reaction"** V. Vaur, I. Koutsopetras, S. Erb, B. Jackowska, R. Benazza, H. Cahuzac, A. Detappe, O. Hernandez-Alba, S. Cianfèrani, C. J. Scott, G. Chaubet*, *ChemBioChem*, 2024, e202400170
- #3 "Targeted delivery of immune-stimulating bispecific RNA, inducing apoptosis and anti-tumor immunity in cancer cells"** T. Rady, S. Erb, S. Deddouche-Grass, R. Morales, H. Bouchard, G. Chaubet, S. Cianfèrani, D. Wiederschain, N. Basse, A. Wagner*, *iScience*, 2024, **27**, 109068
- #4 "SEC-MS in Denaturing Conditions (dSEC-MS) for Rapid In-Depth Analysis of Rebridged Monoclonal Antibody-Based Formats"** R. Benazza, I. Koutsopetras, V. Vaur, G. Chaubet, O. Hernandez-Alba, S. Cianferani*, *Talanta*, 2024, **272**, 125727
- #5 "Site-Selective Protein Conjugation by a Multicomponent Ugi Reaction"** I. Koutsopetras, V. Vaur, R. Benazza, H. Diemer, C. Sornay, Y. Ersoy, L. Rochet, C. Longo, O. Hernandez-Alba, S. Erb, A. Detappe, A. Skerra, A. Wagner, S. Cianferani, G. Chaubet*, *Chem. Eur. J.*, 2024, **30**, e202303242 • selected as "Hot Paper"
- #6 "Reinvestigation of the Automated Synthesis of Stoichiometrically Conjugated Antibodies to Access High Molecular Weight Payloads and Multiplexed Conjugation via an In-Solution Trans-Tagging Process"** V. Lehot, O. Lidický, J. Most, S. Erb, I. Dovgan, A. Osypenko, O. Koniev, S. Kolodych, L. Kotrchová, G. Chaubet, S. Cianfèrani, T. Etrych, A. Wagner*, *ACS Omega*, 2023, **8**, 40508
- #7 "Cysteine-Cysteine Cross-Conjugation of both Peptides and Proteins with a Bifunctional Hypervalent Iodine-Electrophilic Reagent"** I. Koutsopetras, A. K. Mishra, R. Benazza, O. Hernandez-Alba, S. Cianfèrani, G. Chaubet*, S. Nicolai*, J. Waser*, *Chem. Eur. J.*, 2023, **29**, e202302689
- #8 "Microfluidic Droplet Stabilization via SPAAC Promoted Antibody Conjugation at the Water/Oil Interface"** R. Dufosse, M. P. Krafft, S. Ursuegui, M. Mosser, S. Mouftakhir, K. Pernod, G. Chaubet, M. Ryckelynck, A. Wagner; *ACS Appl. Mater. Interfaces*, 2023, **15**, 45498.
- #9 "Targeted Anticancer Agent with Original Mode of Action Prepared by Supramolecular Assembly of Antibody Oligonucleotide Conjugates and Cationic Nanoparticles"** V. Lehot, P. Neuberg, M. Ripoll, F. Daubeuf, S. Erb, I. Dovgan, S. Ursuegui, S. Cianferani, A. Kichler, G. Chaubet, and A. Wagner; *Pharmaceutics*, 2023, **15**, 1643
- #10 "Droplet Surface Immunoassay by Relocation (D-SiRe) for High-Throughput Analysis of Cytosolic Proteins at the Single-Cell Level"** R. Dufosse, S. Ursuegui, S. Baudrey, K. Pernod, S. Mouftakhir, M. Oulad-Abdelghani, M. Mosser, G. Chaubet, M. Ryckelynck, and A. Wagner; *Anal. Chem.*, 2023, **95**, 4470
- #11 "A novel family of acid-cleavable linker based on cyclic acetal motifs for the production of antibody-drug conjugates with high potency and selectivity"** T. Rady, L. Turelli, M. Nothisen, E. Tobaldi, S. Erb, F. Thoreau, O. Hernandez-Alba, S. Cianferani, F. Daubeuf, A. Wagner*, and G. Chaubet*; *Bioconjugate Chem.*, 2022, **33**, 1860
- #12 "An overview of chemo- and site-selectivity aspects in the chemical conjugation of proteins"** C. Sornay, V. Vaur, A. Wagner, and G. Chaubet*; *R. Soc. Open Sci.*, 2022, **9**, 211563
- #13 "Antischistosomal evaluation of stem bark's extract and chemical constituents from *anonidium mannii* against *schistosoma mansoni*"** J. L. T. Matchi, D. T. Nougoué, G. Chaubet, J. Boissier, I. Kuhn, J.-C. Tchouankeu, M. Nothisen, S. Ursuegui, S. A. Ngouela, A. Wagner, *Pharmacog. Mag.*, 2021, **17**, 752
- #14 "Bicyclo[6.1.0]nonyne carboxylic acid for the production of stable molecular probes"** T. Rady, M. Mosser, M. Nothisen, S. Erb, I. Dovgan, S. Cianfèrani, A. Wagner*, and G. Chaubet*; *RSC Adv.*, 2021, **11**, 36777
- #15 "Plasma induced acceleration and selectivity in strain-promoted azide-alkyne cycloadditions"** D. Warther, E. Dursun, M. Recher, S. Ursuegui, M. Mosser, J. Sobska, W. Krezel, G. Chaubet*, and A. Wagner*

Org. Biomol. Chem., 2021, **19**, 5063 • part of the "2021 Organic & Biomolecular Chemistry HOT article collection" and included in the "OBC Editor's Collection"

#16 "Non-specific interactions of antibody-oligonucleotide conjugates with living cells" V. Lehot, I. Kuhn, M. Nothisen, S. Erb, S. Kolodych, S. Cianféroni, G. Chaubet, and A. Wagner*, *Sci Rep*, 2021, **11**, 5881

#17 "Manniindole, an indole derivative from the roots of *Anonidium mannii* and combined antischistosomal and enzymatic activities" J. L. Toussi Matchi, D. T. Nougoué*, I. Kuhn, J. Boissier, J.-C. Tchouankeu, M. Nothisen, G. Chaubet, D. Garnier, S. Ursuegui, S. Augustin, and A. Wagner*; *Nat. Prod. Res.*, 2020, **35**, 5665

#18 "Investigating multicomponent approaches for the site-selective conjugation of native proteins" C. Sornay, S. Hessmann, S. Erb, I. Dovgan, A. Etkirch, T. Botzanowski, S. Cianferani, A. Wagner, and G. Chaubet*, *Chem. Eur. J.*, 2020, **26**, 13797

#19 "Ethynylation of cysteines from peptides to proteins in living cells" R. Tessier, R. K. Nandi, B. Dwyer, D. Abegg, C. Sornay, J. Ceballos, S. Erb, S. Cianferani, A. Wagner, G. Chaubet*, A. Adibekian**, and J. Waser***, *Angew. Chem. Int. Ed.*, 2020, **59**, 10961 • selected as "Hot Paper"

#20 "Recent, non-classical, approaches to antibody lysine modification" G. Chaubet*, F. Thoreau, and A. Wagner, *Drug Discov. Today Technol.*, 2018, **30**, 21

#21 "Dual oxidation state tandem catalysis in the palladium-catalyzed isomerization of alkynyl epoxides to furans" C. Arroniz, G. Chaubet, and E. A. Anderson*, *ACS Catal.*, 2018, **8**, 8290

#22 "Arginine-selective bioconjugation with 4-azidophenyl glyoxal: application to the single and dual functionalisation of native antibodies" I. Dovgan, S. Erb, S. Hessmann, S. Ursuegui, C. Michel, C. Muller, G. Chaubet, S. Cianféroni, and A. Wagner*, *Org. Biomol. Chem.*, 2018, **16**, 1305

#23 "Total synthesis of the schisandraceae nortriterpenoid rubriflordilactone A" G. Chaubet, S. S. Goh, M. Mohammad, B. Gockel, M.-C. A. Cordonnier, H. Baars, A. W. Phillips, and E. A. Anderson*, *Chem. Eur. J.*, 2017, **23**, 14080 • selected as "Hot Paper"

#24 "Total synthesis of (+)-rubriflordilactone A" S. S. Goh, G. Chaubet, B. Gockel, M.-C. A. Cordonnier, H. Baars, A. W. Phillips, and E. A. Anderson*, *Angew. Chem. Int. Ed.*, 2015, **54**, 12618

#25 "Enantioselective synthesis of the predominant AB ring system of the schisandra nortriterpenoid natural products" B. Gockel, S. S. Goh, E. Puttock, H. Baars, G. Chaubet, and E. A. Anderson*, *Org. Lett.*, 2014, **16**, 4480

#26 "From diketopiperazines to hydantoins: an unprecedented rearrangement" G. Chaubet, G. Cazals, A. Lebrun, J. Martinez, and I. Parrot*, *Synlett*, 2014, **25**, 0574

#27 "Stereoselective synthesis of original spirolactams displaying promising folded structures" G. Chaubet, T. Coursindel, X. Morelli, S. Betzi, P. Roche, Y. Guari, A. Lebrun, L. Toupet, Y. Collette, I. Parrot*, and J. Martinez, *Org. Biomol. Chem.* 2013, **11**, 4719

#28 "A tandem aza-Friedel-Crafts reaction/Hantzsch cyclization: a simple procedure to access polysubstituted 2-amino-1,3-thiazoles" G. Chaubet, L. T. Maillard*, J. Martinez, and N. Masurier, *Tetrahedron* 2011, **67**, 4897

#29 "Synthetic studies towards new nucleoside analogues: preparation of (±)-1',4'-dimethyladenosine" G. Chaubet, D. Bourgeois*, and C. Périgaud, *Eur. J. Org. Chem.* 2011, 319

OTHERS

• "Microwave-assisted hydantoins synthesis on solid support" G. Chaubet and I. Parrot*, *Comprehensive Organic Chemistry Experiments for the Laboratory Classroom*, Royal Society of Chemistry, 2016, ISBN: 978-1-84973-963-4

• "TACT projects", EU Research, Winter 2022 issue, pages 15-17 • <https://euresearcher.com/winter-2022/>