GUILHEM CHAUBET

CHARGÉ DE RECHERCHE CNRS • HDR

CO-HEAD OF THE BIOFUNCTIONAL CHEMISTRY TEAM (UMR7199)

Faculté de pharmacie de Strasbourg • 74 route du Rhin • 67400 Illkirch

☎ (+33)3 68 85 42 95 • ✉ chaubet@unistra.fr

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

biofunctional.eu • @BFC_UMR7199

ORCID: 0000-0001-6462-5112

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

Since 2017 **Research in the chemical conjugation of proteins**, focusing on site-selective strategies using multicomponent reactions and new families of reagents (publications #1, 12, 13, and 16; *vide infra*). **Research in chemical biology**: development of new families of cleavable linkers for antibody-drug conjugates applications (#5), work in bioorthogonal chemistry (#8 and 9) and in late-stage modification of bioactive substances (#7 and 11).

2014 – 2017 *Postdoctoral studies in the Ed. Anderson group*. **Total synthesis** of the natural product rubriflordilactone A (publications #17, 18, and 19): 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 (#15). 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 (#20 and 21).

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** (#22 and 23).

AWARDS/PRIZES

2023 **Young Researcher Award** from the Chemical Biology Group of the French Chemical Society

2014 **French Chemical Society prize** for best PhD in chemistry in the Languedoc-Roussillon region.

FUNDING/FELLOWSHIPS

2023
- **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 • Coordinator
"Multicomponent Synthetic Conjugation" (I23-008/01) • 48 k€
- **Emergence@international** • CNRS • 5 k€

2021
- **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
- **Innovative Training Networks** • European Union / Marie Skłodowska-Curie Actions • Coordinator
"Targeted Anti-Cancer Therapies" (TACT, grant agreement #859458) • 3.2 M€

2019
- **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 • Coordinator
"Ugi Reaction for the Site-Specific Bioconjugation of Native Proteins" • 244 k€

2018
- **Région Grand-Est** • Coordinator
"New tools for the bioconjugation of native proteins" • 20 k€
- **IDEX Attractivité** • Coordinator
"Réaction d'Ugi pour la Bioconjugaison Site-Spécifique de Protéines Natives " • 40 k€

2017
- **Région Grand-Est / LabEx Medalis** • Coordinator
"Nouvelles méthodes de bioconjugaison : vers le marquage site-spécifique de protéines natives" • 100 k€

AFFILIATION

2010 – 2013
2021 – Société Chimique de France

TEACHING

2023 – **"Introduction to Biology"** • 10.5-hour course to last-year Master's and engineering school students École européenne de chimie, polymères et matériaux de Strasbourg (ECPM) – University of Strasbourg

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

2021 -	♦ **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 -	♦ **Member** of the thesis commission of the doctoral school 'Chemical Sciences' (ED 222), Strasbourg, France ♦ **Member** of the jury awarding doctoral contracts of the ED 222
2018 -	♦ **IT manager** of UMR 7199, Strasbourg, France

CONFERENCE ORGANISATION & OUTREACH

2020 -	**Organisation of consortium meetings and training activities** for the students of our ITN programme (TACT) One meeting in Strasbourg (one week; main organiser; 30 participants); two meetings in Heidelberg & Belfast (one week each, co-organiser; 20 participants).

REVIEWING ACTIVITY

2023	♦ **Examiner** of two PhD theses • University of Strasbourg ♦ **External expert** • scientific evaluation of application files submitted to the Dutch Research Council (NOW), Netherlands
2022	♦ **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 • ChemBioChem, Organic & Biomolecular Chemistry, Pharmaceutics, Helvetica Chimica Acta, Nature Chemistry

MAJOR COLLABORATIONS

♦ **Prof. Jérôme Waser** • Development of cysteine-selective conjugation reagents • Laboratory of Catalysis and Organic Synthesis (LCSO)/ École Polytechnique Fédérale de Lausane (EPFL)/ Switzerland

♦ **Dr Sarah Cianferani** • Development of analytical methods for the analysis of protein conjugates • Laboratory of Bioorganic Mass Spectrometry (LSMBO)/ University of Strasbourg (UMR 7178)/ France

In the frame of the International Training Networks (ITN) 'Targeted Anti-Cancer Therapies' (TACT):

♦ **Prof. Vijay Chudasama**, Department of Chemistry/ University College London/ United-Kingdom

♦ **Prof. Christopher Scott**, Patrick G Johnston Centre for Cancer Research/ Queen's University Belfast (QUB)/ United-Kingdom

♦ **Dr Bauke Albada**, Laboratory of Organic Chemistry/ Wageningen University & Research/ Netherlands

♦ **Prof. Arne Skerra**, School of Life Sciences/ Technical University of Munich/ Germany

♦ **Dr Graham Cotton**, Protein Therapeutics/ Almac Discovery/ United-Kingdom

♦ **Dr Torsten Hechler,** ADC Research/ Heidelberg Pharma/ Germany

♦ **Dr Christophe Salome**, SpiroChem AG/ Switzerland

PUBLICATIONS

IN PEER-REVIEWED JOURNALS

♦ Currently under review

#1 **"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*, *Angew. Chem. Int. Ed.*

#2 **"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* • available as pre-print at https://chemrxiv.org/engage/chemrxiv/article-details/647f60b2e64f843f416bff1c

#3 **"Retinoids Molecular Probes by Late-stage Azide Insertion - Functional Tools to Decrypt Retinoid Metabolism"** J. Coulleray, A. Kindler, N. Rochel-Guiberteau, G. Chaubet, W. Krezel, A. Wagner*, *ChemBioChem*

#4 **"Antibody conjugated to a bispecific RNA molecule targeting RIG-I and PLK1"** T. Rady, S. Erb, S. Deddouche-Grass, R. Morales, H. Bouchard, G. Chaubet, S. Cianférani, D. Wiederschain, N. Basse, A. Wagner*, *eLife*

♦ Accepted

#1 **"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. Cianférani, T. Etrych, A. Wagner*, *ACS Omega*, 10.1021/acsomega.3c05206

♦ Published

#1 "**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. Cianférani, G. Chaubet*, S. Nicolai*, J. Waser*, *Chem. Eur. J.*, 2023, doi.org/10.1002/chem.202302689

#2 "**Microfluidic Droplet Stabilization via SPAAC Promoted Antibody Conjugation at the Water/Oil Interface"** R. Dufossez, M. P. Krafft, S. Ursuegui, M. Mosser, S. Mouftakhir, K. Pernod, G. Chaubet, M. Ryckelynck, A. Wagner; *ACS Appl. Mater. Interfaces*, 2023, doi.org/10.1021/acsami.3c10655

#3 "**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

#4 "**Droplet Surface Immunoassay by Relocation (D-SIRe) for High-Throughput Analysis of Cytosolic Proteins at the Single-Cell Level**" R. Dufossez, 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

#5 "**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

#6 "**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**, 9211563

#7 "**Antischistosomal evaluation of stem bark's extract and chemical constituents from *anonidium mannii* against *schistosoma mansoni***" J. L. T. Matchi, D. T. Noungoue, G. Chaubet, J. Boissier, I. Kuhn, J.-C. Tchouankeu, M. Nothisen, S. Ursuegui, S. A. Ngouela, A. Wagner, *Pharmacog. Mag.*, 2021, **17**, 752

#8 "**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. Cianférani, A. Wagner*, and G. Chaubet*, *RSC Adv.*, 2021, **11**, 36777

#9 "**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"

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

#11 "**Manniindole, an indole derivative from the roots of *Anonidium mannii* and combined antischistosomal and enzymatic activities"** J. L. Toussi Matchi, D. T. Noungoue*, 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

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

#13 "**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"

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

#15 "**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

#16 "**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. Cianférani, and A. Wagner*, *Org. Biomol. Chem.*, 2018, **16**, 1305

#17 "**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"

#18 "**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

#19 "**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

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

#21 "**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

#22 "**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

#23 "**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/