

# SOPHIE CERSOY

21-09-1985

Associate professor



## Affiliation

Centre de Recherche sur la Conservation, CNRS USR 3224  
French natural History museum (MNHN)  
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Nationality : French

Driving Licence (2010)

## 👉 WORK EXPERIENCE

### **Associate professor | Muséum national d'Histoire naturelle - MNHN, Paris (France)**

Since Oct. 2017

#### **“Preservation of natural historic collection rich in collagen”**

- Identification of fluid from wet collection using non invasive micro-Raman spectroscopy (lab and portable devices) and spot tests
- Inventory of degradations and environmental conditions (%RH, T, lighting, VOC) in wet collections
- Characterization and hermeticity measurement of historical and modern closure systems (Py-GC/MS, ATR-FTIR spectroscopy, DSC, SEM-EDX, X-ray fluorescence and proteomics)
- Evaluation of the state of degradation of collagen fibrils in skin of natural history specimen using multiphoton imaging (and ATR-FTIR spectroscopy)
- Detection of heavy metal contaminants (using X-ray fluorescence and As spot tests), skin preservation state and tanning agents (using ATR-FTIR, DSC, spot tests,  $\mu$ Raman spectroscopy) on naturalized specimens
- (occasional) Species identification using ATR-FTIR and proteomics on historical and archaeological biological tissues (mostly bones)

Collaboration with the mass spectrometry team of Communication Molecules and Adaptation of Micro-Organisms (CMAM) lab (MNHN) for proteomics analysis, the Laboratory of Optics and Biosciences (LOB, Ecole Polytechnique) and with taxidermist and collection managers from Paris, Munich, Cardiff, Washington and Berlin.

Fundings : - French national History Museum Thematic Priorities Funding (ATM) and master student funding

- OPUS Sorbonne university PhD funding
- Lab own funds (from the French Ministry of Culture)

### **Secondary school physics teacher | Paris school district (France)**

Sept 2016 – Aug. 2017

**Courses, practical works, experimental project monitoring, tests design, correction and grading** in Physics, Chemistry and technological training in English (ETLV) for scientific pupils from Première S and STL (11<sup>th</sup> grade in Science and

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laboratory technique) and Terminale STL and STI2d (12<sup>th</sup> grade in science, laboratory technique and industrial technology) – 15 hours per week.

**Postdoctoral fellow | Muséum National d'Histoire Naturelle - MNHN, Paris (France)**

Sept 2014 –Aug. 2016

« **Characterization and <sup>14</sup>C dating of ultra-small bone collagen samples** ».

Advisor : Dr Antoine Zazzo (MNHN – UMR 7209)

Co-advisor : Dr Séverine Zirah (MNHN – UMR 7245)

**Description:** Testing of eight **collagen extraction protocols**, to choose the best suited to the dating of bone micro-samples depending on the biochemical characterization of the organic residues by mass spectrometry (IRMS, **LC-MS/MS**, Py-GC/MS and **Py-GCxGC/MS**). Preparation of the micro-samples for <sup>14</sup>C dating on the collagen extraction line and subsequent graphitization (using AGE3) and measurement using AMS **Compact Radiocarbon System** (CRS) located in Gif-sur-Yvette (France – July 2015). **Prescreening of bone samples using ATR-FTIR.**

Collaboration with Natural History of Prehistoric Human lab (MNHN) for FT-IR spectroscopy, Collection Preservation Research Center (CRCC - MNHN) for PyGC/MS and Py-GCxGC/MS analysis and with the mass spectrometry team of Communication Molecules and Adaptation of Micro-Organisms (CMAM) lab (MNHN).

Fundings : - LabEx BCDiv- Biological and Cultural Diversities: Origins, Evolution, Interactions, Future (OPERA project)

- French national History Museum Thematic Priorities Funding (ATM) “Mineral/Living beings interactions” (DecorAtrice project)

**Research and Teaching Assistant | Institut Néel, Grenoble (France)**

Sept 2012 –Aug. 2014

- **Teaching** in fundamental and applied Physics and Mathematics at Université Joseph Fourier University (Grenoble, France). Undergraduate level (1<sup>st</sup> year Technical University Diploma) - 192 hours per year plus course design and implementation.
  - **Research in Materials Sciences** at Institut Néel – CNRS (Grenoble):
  - « **Structural analysis of Cultural Heritage materials using combined techniques** ».
- Advisor: Dr Pauline Martinetto. Mentors: Pr J-L Hodeau and Pr Pierre Bordet

**Description:** Structural analysis of complex ill-ordered materials (carbon black **cosmetics** and inks from the roman site of Pompeii) using **X-Ray Diffraction-Scattering/Tomography** (DSCT), X-ray fluorescence, **Pair distribution function** (PDF) approach, Raman microspectroscopy and **Inelastic X-Ray Spectroscopy**(IXRS). Experiments at **synchrotron** (ESRF: D2AM and FAME and SOLEIL: DiffAbs).

Collaboration on various projects with local curators and laboratories: exhibition to come at the archaeological Museum of Grenoble and the St Antoine Abbey, France; analysis of rock art samples with complex stratigraphy from the Aboriginal

site of Gabarnmang (Arnhem territories, Australia) using Raman spectroscopy, MEB and microdiffraction (collaboration with EdyTEM, France – Dr Emilie Chalmin)

**PhD student and teaching assistant | Centre for Research and Restoration of the Museums of France- C2RMF (Paris, France) then Structural and Molecular Archaeology Laboratory – LAMS (Ivry-sur-Seine)**

Sept. 2009 – Aug. 2012

- **Teaching** in fundamental Physics at Université Pierre et Marie Curie – Paris VI (Paris, France). Undergraduate level (first year bachelor's and master's degree) - 64 hours per year. Practical works and projects, tutorials and oral examinations.
- **PhD Research project: « Chemical imaging of ancient biological tissues ».**  
Supervisor: Pr Philippe Walter. Tutor : Dr Pascale Richardin

**Description:** Chemical analysis of mummy **skin**, modern and ancient keratin- (hair, horn) and collagen-based (**bones**) tissues using **TOF-SIMS imaging** mostly, in combination with SEM-EDX, FT-IR spectroscopy, XRD and GC-MS.

Optimization of micro sample preparation from resin embedment, micro-sawing and grinding to achievement of **microtomy** slices.

Data treatment of complex mass spectra (especially proteins one).

Development of a relevant database of amino acids TOF-SIMS spectra.

Collaboration with the mass spectrometry team of the Natural Product Chemistry Institute (Pr Alain Brunelle - ICSN, Gif/Yvette) and the TEM platform of Vegetal Sciences Institute for ultramicrotomy (Danielle Jaillard - ISV, Gif/Yvette).

Funding : Specific Doctoral award for Normal Sup' Graduate student

**MSc intern (2<sup>nd</sup> year) | Centre for Research and Restoration of the Museums of France- C2RMF (Paris, France)**

Feb 2009 – Jun 2009

**« TOF-SIMS imaging of Cultural Heritage hybrid materials ».**

Supervisor : Dr Pascale Richardin

**Description:** High resolution **TOF-SIMS imaging** experiment of a Rembrandt's **paint** cross section and corresponding data treatment.

Analysis of lipids degradation during the heating of linseed oils to manufacture **varnishes** and in roman oil-based **cosmetics**. Collaboration with the mass spectrometry team of the Natural Product Chemistry Institute (ICSN), the TEM platform of Vegetal Sciences Institute for ultramicrotomy (ISV, Gif/Yvette) and the Royal Institute for Cultural Heritage (IRPA-KIK, Bruxelles – Dr Jana Sanyova).

**MSc intern (1<sup>st</sup> year) | Statistical Physics Laboratory- École Normale Supérieure – Normale Sup (Paris)**

Apr 2007 – Jul 2007

**« Equation of state and stability limit of water ».**

Supervisor : Dr Frederic Caupin (Sébastien Balibar research team)

**Description:** Investigation of the threshold for cavitation limit in stretched heavy water using acoustic cavitation (measurement of the cavitation pressure for various temperatures). Comparison with results obtained previously on ultrapure water. Calibration of a hydrophone to perform further cavitation pressure measurements.

**BSc. Intern | Centre for the Development of Applied Geosciences-CDGA (Bordeaux, France)**Jun 2006« **Geophysical surveys of archaeological and monumental heritage sites** »Supervisor: Pr Michel Martinaud

**Description:** Discovery of research issues. In-situ **geophysical** measurements using electrical and magnetic methods (Langoiran former Middle Age Castle, France). Participation in the geological ground penetrating radar campaign (Oloron-St Marie Church, France): in-situ measurements and data treatment in the attempt of detecting a crypt under St Marie's church.

**Teaching Intern | Lycée Marcellin Berthelot (St Maur, France)**Nov 2006-Feb 2007

**Tutorials, practical works, exam design and course work corrections** in Physics and Chemistry for scientific pupils from Première (11<sup>th</sup> grade) and Terminale (12<sup>th</sup>)

 **EDUCATION****PhD | Université Pierre et Marie Curie – UPMC (Paris VI, France)**Jan. 2013**PhD** in Materials Physics and Chemistry with *First Class Honours*Thesis supervisor: Pr Philippe Walter. Tutor: Dr Pascale Richardin**School diploma | École Normale Supérieure (Cachan, France)**Jul. 2009**School diploma** in Physics.**MSc (2<sup>nd</sup> year) | Université Pierre et Marie Curie – UPMC (Paris VI)**Jun 2009**MSc** in Materials Sciences *cum laude***Agrégation | École Normale Supérieure de Cachan (Cachan, France)**Jul 2008

**State competitive examination for becoming a French teacher in higher education in Physics.** *Rank after oral examination: 46/112.*

**Entrance exam | École Normale Supérieure de Cachan (France)**Jul 2007

**Competitive examination for becoming an elite student teacher/researcher (official)**

**MSc (1<sup>st</sup> year) | École Normale Supérieure de Cachan (Cachan, France)**Jun 2007

**MSc** in Fundamental Physics *cum laude*, Speciality : Physics, Theory, Experiments and Models (PhyTEM program for elite students)

**BSc. | École Normale Supérieure de Cachan (Cachan, France)**Jun 2006

**BSc** in Fundamental Physics *cum laude*, Speciality : Physics, Theory, Experiments and Models (PhyTEM program for elite students)

« **Classes préparatoires** » | **Lycée Marcellin Berthelot (St Maur, France)**  
Sept 2002–Jun 2005

Two year training to prepare for the **French “Grandes Écoles”**  
 Major in Mathematics and Physics (1<sup>st</sup> year) and Physics and Engineering (2<sup>nd</sup> year)

**French Baccalauréat** | **Lycée Marcellin Berthelot (St Maur, France)**  
Jun 2002

**A Level** in Sciences (major in mathematics) with “Good” *distinction*

 **PUBLICATIONS AND PRESENTATIONS**

 **Papers** | **Peer-reviewed international papers**

- Cer soy, S., Rouchon, V., Belhadj, O., Cuisin, J., Herbin, M., 2021. Non-invasive fluid identification: potential of micro-Raman spectroscopy. *Collection Forum*. Accepted.
- Le Meillour, L., Zirah, S., Zazzo, A., Cer soy, S., Détroit, F., Imalwa, E., Lebon, M., Nankela, A., Tombret, O., Pleurdeau, D., Lesur, J., 2020. Palaeoproteomics gives new insight into early southern African pastoralism. *Scientific Reports*, 10, 14427. <https://doi.org/10.1038/s41598-020-71374-3> [IF: 4.576]
- Cucchi, T., Papayianni, K., Cer soy, S., Aznar-Cormano, L., Zazzo, A., Debruyne, R., Berthon, R., Balasescu, A., Simmons, A., Valla, F., Hamilakis, Y., Mavridis, F., Mashkour, M., Darvish, J., Siah sarvi, R., Biglari, F., Petrie, C.A., Weeks, L., Sardari, A., Maziar, S., Denys, C., Orton, D., Jenkins, E., Zeder, M., Searle, J.B., Larson, G., Bonhomme, F., Auffray, J.-C., Vigne, J.-D. (2020). Tracking the Near East origins and European dispersal of the house mouse and some clues for the elusive cat domestication process. *Scientific Reports*, 10, 8276. <https://doi.org/10.1038/s41598-020-64939-9>. [IF: 4.525, 6 citations]
- Rofes, J., Cer soy, S., Zazzo, A., Royer, A., Nicod, P.-Y., Laroulandie, V., Langlais, M., Pailler, Y., Léandri, C., Léandri, F., Lebon, M., Tresset, A. (2020). Detecting stratigraphical issues using direct radiocarbon dating from small-mammal remains. *Journal of Quaternary Science*, 35(4), 505-513. <https://doi.org/10.1002/jqs.3193> [IF: 2.846]
- Cer soy, S., Zirah, S., Marie, A., Zazzo, A. (2019) “Toward a versatile protocol for radiocarbon and proteomics analysis of ancient collagen”. *Journal of Archaeological Science*, 101, 1-10. <https://doi.org/10.1016/j.jas.2018.10.009> [IF : 3.061, 5 citations]
- Le Meillour, L., Zazzo, A., Lesur, J., Cer soy, S., Marie, A., Lebon, M., Pleurdeau, D., Zirah, S. (2018) “Identification of degraded bone and tooth splinters from arid environments using palaeoproteomics.” *Palaeogeography, Palaeoclimatology, Palaeoecology*, 511, 472-482. <https://doi.org/10.1016/j.palaeo.2018.09.013> [IF : 2.375, 6 citations]

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- Cer soy, S., Daheur, G., Zazzo, A., Zirah, S., Sablier, M. (2018) "Pyrolysis comprehensive gas chromatography and mass spectrometry: A new tool to assess the purity of ancient collagen prior to radiocarbon dating." *Analytica Chimica Acta*, 1041, 131-145. <https://doi.org/10.1016/j.aca.2018.07.048> [IF : 5.123, 8 citations]
  
  - Rofes, J., Cucchi, T., Hanot, P., Herman, J., Stephan, P., Cer soy, S., Horáček, I., Kerr, E., Allberry, K., Valenzuela, S., Zazzo, A., Cornette, R., Tresset, A. (2018) Postglacial recolonization and Holocene diversification of *Crocidura suaveolens* (Mammalia, Soricidae) on the north-western fringe of the European continent." *Quaternary Science Reviews*, 190:1-10. <https://doi.org/10.1016/j.quascirev.2018.04.016> [IF : 4.334, 3 citations]
  
  - Cer soy S., A. Zazzo, J. Rofes, A. Tresset, S. Zirah, C. Gauthier, E. Kaltnecker, F. Thil & N. Tisnerat-Laborde (2017) "Radiocarbon dating minute amounts of bone (3–60 mg) with ECHoMICADAS". *Scientific Reports*, 7, 714, doi:10.1038/s41598-017-07645-3. [IF: 4.259, 14 citations]
  
  - Cer soy, S., Zazzo, A., Lebon, M., Rofes, J., Zirah, S. (2017) "Collagen Extraction and Stable Isotope Analysis of Small Vertebrate Bones: A Comparative Approach". *Radiocarbon*, 59(3), 679- 694. <https://doi.org/10.1017/RDC.2016.82>. [IF: 4.565, 26 citations]
  
  - Chalmin, E., Castets, G., Delannoy, J.-J, Barker, B., B., David, B., Lamb, L., Soufi, F. Pairis, S., Cer soy, S., Martinetto, P., Geneste, J.-M., Hoerlé, S., Richards T., Gunn R. (2016). "Geochemical analysis of the painted panels at the "Genyornis" rock art site, Arnhem Land, Australia." *Quaternary International*, 430(A), 60-80. <http://dx.doi.org/10.1016/j.quaint.2016.04.003>. [IF: 2.067, 15 citations]
  
  - Cer soy, S., Martinetto, P., Bordet, P., Hodeau, J.-L., Van Elslande, E., Walter, P. (2016) "Identifying and quantifying amorphous and crystalline content in complex powdered samples: application to archaeological carbon blacks" *Journal of Applied Crystallography*, 49, 585-593. <https://doi.org/10.1107/S1600576716003551>. [IF: 2.570, 7 citations]
  
  - Cer soy, S., Leynaud, O., Alvarez-Murga, M., Martinetto, P., Bordet, P., Boudet, N., Chalmin, E., Castets, G., Hodeau, J.-L. (2015). "Laboratory implementation of X-Ray diffraction/scattering computed microtomography". *Journal of Applied Crystallography*, 48(1) °: 159-165. <https://doi.org/10.1107/S1600576714027204>. [IF: 2.570, 6 citations]
  
  - Cer soy, S., Martinetto, P., Bordet, P., Hodeau, J.-L., Walter, P., Van Elslande, E. (2014). "Analysis of archaeological samples using XRPD-PDF and Raman spectroscopy". *Acta Crystallographica Section A: Foundations and Advances*, A70: C863. <https://doi.org/10.1107/s2053273314091360>. [IF: 2.307]
  
  - Desenfant, A., Bily, A., Girardeau, P., Bertrand, M., Riassetto, D., Ruty, N., David, T., Cornuejols, D., Vauquois, F., Jeany, J., De-Boissieu, M., Guinebretière, R., Durand, C., Douillet, S., Cer soy, S., Hodeau, J.-L. (2014). "Crystallography history, a tool for science education". *Acta Crystallographica Section A: Foundations and*
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*Advances*, A70: C1041. <https://doi.org/10.1107/s205327331408958X>. [IF : 2.307]

- Cer soy, S., Richardin, P., Walter, P., Brunelle, A. (2012). "Cluster TOF-SIMS imaging of human skin remains: Analysis of a South-Andean mummy sample." *Journal of Mass Spectrometry*, 47(3): 338-346, <http://dx.doi.org/10.1002/jms.2979>. [IF: 3.214, 30 citations]
- Sanyova, J., Cer soy S., Richardin, P., Lapr evote, O., Walter, P., Brunelle, A. (2011). "Unexpected Materials in a Rembrandt Painting Characterized by High Spatial Resolution Cluster-TOF-SIMS Imaging." *Analytical Chemistry*, 83(3): 753-760, <http://dx.doi.org/10.1021/ac1017748>. [IF: 5.856, 48 citations]
- Arvengas, A., E. Herbert, Cer soy S., Davitt, K., Caupin, F. (2011). "Cavitation in Heavy Water and Other Liquids." *Journal of Physical Chemistry B*, 115(48): 14240-14245, <http://dx.doi.org/10.1021/jp2050977>. [IF: 3.302, 21 citations]

#### Papers | Peer-reviewed national papers

- Vercout ere, C., Gu erin, C., Cr epin, L., Richardin, P., Gandolfo, N., Vincent, J., Marsac, J., Cer soy, S., Rousseli ere, H., Walter, P., Brunelle, A., Nowik, W., Brissaud, D., Drucker, D.G., van der Plicht, J., Patou-Mathis, M., Vialet, A.(2013) "Pluridisciplinary research on a woolly rhinoceros skeleton, *Coelodonta antiquitatis* (Blumenbach, 1799), from the Institut de pal eontologie humaine (Paris, France)", *L'Anthropologie*, 17, 1-47, <http://dx.doi.org/10.1016/j.anthro.2013.01.003>. [IF: 0.569, 1 citation]

#### Books | Exhibition catalogue and book chapter

- Cer soy S. & Baydoun R. (2021) "Pre-treatment protocols and characterization of samples for radiocarbon dating", *Technical Reports Series No.* , IAEA, Vienna.
- Collective work. (2014) "Gemstones, a bright history", *Mus e de Saint-Antoine l'Abbaye*, 120 pages. (ISBN 978-2-35567-090-9)
- Castets, G., Chalmin, E., David, B., Geneste, J.-M., Delannoy, J.-J., Gunn, R., Soufi, F., Pairis, S., Martinetto, P., Cer soy, S., Barker, B., Lamb, L., Hoerl e, S., Boche, E. (2014) "Rock paintings in Jawoyn country, Arnhem Land (Australia): An integrated study." In : *Sobre rocas y huesos: las sociedades prehist ricas y sus manifestaciones pl sticas*, p. 378-405. (ISBN 978-84-617-2993-7)

#### Report | Mid term report (Marie Curie project of Juan Rofes)

- Cer soy, S. (2015) "Radiocarbon dating of micro-samples of shrew bones" In Rofes, J. « Mid-term report. People Marie Curie Actions Intra-European Fellowships (IEF) : Small\_Mam\_Recoll ». ([http://cordis.europa.eu/result/rcn/188950\\_en.html](http://cordis.europa.eu/result/rcn/188950_en.html))

#### Report | Analytical reports



- Cer soy, S. & Kazan, J. (2020) "Identification of Mosasaurus bone restorative materials", Analytical report for the Naturalia restoration studio of the MNHN.
- Cer soy, S., Zuber, B., Müller, C., Coehlo, V. (2019) "Identification of a restoration material of a Megaceros antler (paleontology collection, MNHN) from the Saint-Prest site", Analytical report for the Naturalia restoration studio of the MNHN.
- Cer soy, S. & Cuisset, V. (2019) "Material identification of the giant squid specimen Wheke from the Grande Galerie de l'Evolution, MNHN", Analytical report for the Naturalia restoration studio of the MNHN.
- Cer soy, S. & Grisanti, F. (2019) "Arsenic detection on taxidermy specimen from INJA", Analytical report for the Naturalia restoration studio of the MNHN.
- Touron, S., Frouin, M. & Cer soy, S. (2019) "BLANDAS – 30, Gard (Occitanie). Grotte de la Baumelle. MH 2016. Origine et composition de la roche constitutive de la stèle, bilan sanitaire global du réseau et conservation du site", LRMH, Internal analytical report of the Ministry of Culture.
- Richardin, P., Langlois, J., Cer soy, S., Carminati P. (2010) "GC-MS analysis of mummy skin samples from South America, preserved at Musée de l'Homme, and being restored at Ecole des Beaux-Arts de Tours." – Internal analytical report of the C2RMF.
- Martinaud M., Bégaudeau K., Cer soy S. & Guillemardet J.-L. (2006) "Geophysical prospection related to the study of Langoiran Castle (Gironde)". Regional archaeology department from Aquitaine, 16 p.

### Talk | International conference

- **SPNHC 2019** : Cer soy, S., Herbin, M., Belhadj, O., Rouchon, V. "Preservation of wet collections : non-invasive fluid identification using micro-raman spectroscopy", 29<sup>th</sup> May 2019, Field Museum, Chicago (US).
- **Pfc 2018** (« Symposium on the Preservation of wet collections : feedbacks and perspectives ») : Cer soy, S., Herbin, M., Rouchon, V., Cuisin, J. « Non invasive fluid identification : potential of micro-Raman spectroscopy », 7 Dec. 2018, MNHN, Paris (France).
- **Pyro 2016** (21<sup>st</sup> International Symposium on Analytical and Applied Pyrolysis): G. Daheur, B. Han, Sablier M., Cer soy S., Zazzo A. "Benefits of the use of Py-GCxGC/MS compared to Py-GC/MS: an illustration through two examples taken from cultural heritage studies", 10<sup>th</sup> May 2016, Nancy (France).
- **Radiocarbon 2015** : Cer soy S., S. Zirah, A. Marie et al. "Optimization of the radiocarbon dating of bone microsamples using a multi-proxy approach", 18<sup>th</sup> Nov. 2015 and Tisnérat-Laborde N., Thil F., Synal H.-A., S. Cer soy, et al. "ECHO MICADAS: A new compact AMS facility measuring <sup>14</sup>C dedicated to Environment, Climate and Human Sciences", 19<sup>th</sup> Nov. 2015, Dakar (Sénégal).



- **Technart 2015** : Pouyet E., Guiblain T. & Cer soy S. “Characterization of applied brocades from Savoie duchy, France, by means of combined micro-analytical techniques.” and Castets, G., Chalmin, E., David, B., Delannoy, J.-J., Geneste, J.-M., Develle, A.-L., Faycal, S., Martinetto, P., Paris, S., Cer soy, S., Magnin, V., Gunn, R. G , Barker, B., , Katherine, M.. “Investigating the excavated coloured rocks ('ochres') from Nawarla Gabarmang, a c. 48,000 year old Aboriginal site in northern Australia” , 30<sup>th</sup> Apr. 2015, Catania (Italy).
- **SR2A 2014** (Synchrotron radiation and neutrons in art and archaeology Conference): Martinetto P., Cer soy S., Bordet P. et al. “Combined structural analysis of ancient ill-ordered carbon-based cosmetics and inks”, 11<sup>th</sup> Sep. 2014, Paris (France).
- **SIMS XVIII<sup>th</sup>**: Cer soy S., Richardin P., Brunelle A. et al. “Cluster ToF-SIMS imaging on ancient biological tissues”, 20<sup>th</sup> Sep. 2011, Riva del Garda (Italy).

### Talk | National conference

- **CRBC professional day**: Cer soy, S. & Herbin, M. “Of specimen and men: preserving natural History museum fluid collections, safely and securely”, Cité de l'Architecture et du Patrimoine, Paris, 21-22<sup>th</sup> Mar. 2019.
- **4<sup>th</sup> French Speaking Radiocarbon network Day** (REFRAIN 2016): Cer soy, S., Zazzo, A., Rofes, J., Tresset, A., Gauthier, C., Kaltnecker, E., Thil, F., Tisnérat-Laborde, N. “Radiocarbon dating of collagen microsamples using ECHOMICADAS : first results.”, Gif/Yvette, 21<sup>st</sup> Nov. 2016.
- **XI<sup>th</sup> X-Ray and Materials Congress**: Chalmin E., Castets G., Martinetto P., Cer soy S. *et al.* “X-rays at the service of Australian cave art ; identification of pictorial matter and alteration phases” and Leynaud O., Martinetto P., Bordet P., Cer soy S. *et al.* “ $\mu$ -X-Ray diffraction/scattering tomography experiment on a lab source”, Grenoble (France), 1<sup>st</sup>-4<sup>th</sup> Dec. 2015
- **3<sup>rd</sup> French Speaking Radiocarbon network Day** (REFRAIN 2015) : Cer soy, S., Zirah, S., Marie, A., Lebon, M., Daheur, G., Sablier, M., Tombret, O., Zazzo, A. “Optimization of the collagen extraction from bone microsamples : a multiproxy approach”, Lyon (France), 5<sup>th</sup> Nov. 2015.
- **XX<sup>th</sup> Archaeometry symposium – GMPCA**: Pouyet E., Guiblain T., Cer soy S. *et al.* “Applied brocades from Savoie duchy, France, from the XV<sup>th</sup> and XVI<sup>th</sup> century: direct legacy of a Germanic know-how or example of a local evolution?”, 29<sup>th</sup> Apr. 2015, Besançon (France).
- **X<sup>th</sup> X-Ray and Materials Congress**: Cer soy S., Martinetto P. *et al.* “Structural analysis of archaeological carbon based material using combined techniques”, 13<sup>th</sup> Nov. 2013, Nantes (France).

### Talks | Workshops and Seminars

- **MicroArt 3D** project : Kick-off meeting, CRC, MNHN, Paris, 27<sup>th</sup> Jan. 2020

- **ANR JCJC « Wildsilk »** : Kick-off meeting, CRC, MNHN, Paris, 13<sup>rd</sup> Nov. 2019
- Interdisciplinary workshop on the degradation of flat skins in natural history collections, invited speaker, « Degrading skins at the French natural History Museum : Conservation research in Paris », Freiberg (Germany), 13-15<sup>th</sup> Jun. 2018 - Organisation : Museum für Naturkunde, Berlin (S. Bock).
- PAGE seminar (team seminar), MNHN, Paris (France), 14<sup>th</sup> Apr. 2015
- New docs and postdocs introducing (UMR 7209), MNHN, Paris, 9<sup>th</sup> Oct. 2014.
- **BM02 Beamline Review Panel**, ESRF, Grenoble, 20<sup>th</sup> May 2014
- **ESRF-CRG user's meeting**, Institut Néel, Grenoble, 27<sup>th</sup> Nov. 2013
- Department Seminar, Institut Néel, Grenoble, 14<sup>th</sup> Mar. 2013
- Raman user's meeting, Institut Néel, Grenoble, 17<sup>th</sup> Jan. 2013
- New Students and Staff Day, Institut Néel, Grenoble, 11<sup>th</sup> Dec. 2012
- **XVI<sup>th</sup> Spring School of the Youth Researcher of the French Mass Spectrometry Society** (CJSM), Pissos, (France), 4-8<sup>th</sup> Apr. 2011.
- Mass Spectrometry team Seminar, ICSN, Gif-sur-Yvette, 16<sup>th</sup> Dec. 2010.
- **XV<sup>th</sup> Spring School of the Youth Researcher of the French Mass Spectrometry Society** (CJSM), St Jean St Nicolas (France) 26.-30<sup>th</sup> Apr. 2010.

### Posters | International conference

- **23<sup>rd</sup> IUCr 2014**, Montreal (Canada), 5<sup>th</sup>-12<sup>th</sup> Aug. 2014.
- **SIMS XVIII<sup>th</sup>**, Riva del Garda (Italy), 18<sup>th</sup> -23<sup>th</sup> Sep. 2011.
- **International School Hubert Curien** – « Structural and Molecular Archaeology: 3<sup>th</sup> Course on the Non Invasive analysis of Paintings”, Erice (Italy) 14<sup>th</sup>-21<sup>th</sup> Jun 2010.

### Poster | National conference and Workshop

- **SMAP 2015** (French congress about mass spectrometry and proteomics), Ajaccio, 15-18 Sep. 2015
- New docs and postdocs introducing (MCAM), MNHN, Paris, 17<sup>th</sup> Oct. 2014.
- **French Crystallography Society Congress(AFC)**, Bordeaux (France), 2-5<sup>th</sup> Jul 2013
- 2<sup>nd</sup> Korea-France Heritage Science Workshop, Paris (France), 28-29<sup>th</sup> Oct 2010

## FORMATIONS AND ATTENDANCES

### Professional training | Technical training

- “Using the portable Raman system iRaman Plus”, BWTech, LRMH, Champs-sur-Marne (France), 26<sup>th</sup> Sept. 2019.

### Professional training | Pedagogical coaching

- “Project teaching” coaching company Resultence, MNHN, Paris (France), 2019-2020 (3 days)

### Professional training | Proteomics practical CNRS training

- “Protein characterization using mass spectrometry in the context of proteomics” CNRS enterprises formation (with practical training), SMBP (USR 3149), Paris (France), 23-27<sup>th</sup> Nov. 2015 (5 days)

 **Professional training | National school**

- OxCal (radiocarbon software) practical training, by Anita Quilès (IFAO, Caire), MNHN, Paris (France), 3<sup>rd</sup> Nov. 2014 (half a day).

 **Professional training | International School**

- Analysis of Diffraction Data in Real Space School (ADD 2013) Institut Laue Langevin (ILL), Grenoble (France), 2013 (5 days)

 **Professional training | Teaching skills**

- Pedagogy and group management, training office "Mane Gere"(UPMC), Paris (France), 2012 (3 days).
- Communication techniques in an educational perspective, Alain Finkel (ENS Cachan), Cachan (France), 2012 (2 days)
- Speak up before a group, UPMC, Paris (France), 2011 (2 days)

 **COMMUNITY SERVICE**

**Lecture | "CNRS unusual visits" (Festival of Science in Paris)**

- Lecture and meeting on the conservation of Natural History collections (wet and naturalized collections) and visit to the Museum's Zootheque (with V. Rouchon, A. Tournié, J. Cuisin and B. Zuber), CRC -MNHN, Paris, Oct. 2020.

**Lecture | EHESS seminar**

- "At the heart of the material : what the textile fibres can reveal", EHESS, Paris, 23<sup>rd</sup> Mar. 2018.

**Lecture | IYCr 2014 Lecture**

- «Sapphires and rubies: from dream to innovation » (with Hervé Legal from RSA la Rubis), Chemistry Museum, Jarrie, 20<sup>th</sup> Nov. 2014.

**Lecture | "Gems, a bright history" autumn lecture (IYCr 2014)**

- «Art and sciences of crystals and gems: from delight to knowledge », Natural History Museum, Grenoble, 1<sup>st</sup> Oct. 2014.

**Lecture | High School « Ambiscience » Day (Grenoble Academy)**

- «Arts and sciences, disjointed issues? », UJF, Grenoble, 20 Feb. 2013.

**Public experiments | Festival of Science in Paris (MNHN)**

- « Preservation of wet collections »: Poster presentation and demonstration (portable Raman and salting-out tests), 12<sup>th</sup>-13<sup>th</sup> Oct. 2019.

**Public experiments | Festival of Science in Paris (MNHN)**

- « Radiocarbon dating »: Poster presentation and demonstration, 12<sup>th</sup> Oct. 2017.

**Public experiments | Festival of Science in Paris (MNHN)**

- « Crystals: a well-ordered world! ». Children workshops, 12<sup>th</sup> Oct. 2014.

**Public experiments | Festival of Science in Grenoble (Institut Néel)**

- « Colour and Light »: Optics experiments, children workshops, 10-13<sup>th</sup> Oct. 2013.

**Demonstration | High School program « 100 researchers/100 class »**,

- Microspectroscopy analysis of Blue Maya fresco for 11th and 12th grade pupils from the Lycée de Pontcharra (France), Institut Néel, Grenoble, 10th Apr. 2014

**Pedagogical responsibilities | PhD supervising committee**

- Meeting of the PhD supervising committee of L. Le Meillour (PhD MNHN, archaeozoology and proteomics), 2017-2020.

**Pedagogical responsibilities | Maths course at UJF, Grenoble**

- Planning, exam preparation, coordination of the teachers, 2013/2014.

**Conference organization | International meetings**

- Organisation of pfc2018 meeting, MNHN, 5-7 Dec. 2018 : bilingual website (<https://pfc2018.sciencesconf.org/>), animation of the meetings of the scientific and organization committee, diffusion, collection of abstracts and synthesis of the evaluations, answers to the participants, organization of the visits of collections, putting on line of the program, participation in the logistic organization, proceedings.
- EPDIC 13 conference, Grenoble, 28-31<sup>th</sup> Oct 2012 : Welcome and registration of the participants, logistics.

**Mentoring experience | Interns**

- Co-supervising of a **HND** chemistry intern (BTS in chemistry) from ENCPB (W. Jabir) on “Chemical analyses of alum-tanned skins (parchments, hides and naturalized specimens)”, CRC, Paris, Nov-Dec 2020.
- Co-supervising of a Research Master intern (**M2** Museology) from the MNHN (M. Aladini) on “Inventory of degradations in wet collections: describe, document and classify for a better preservation.”, CRC, Paris, Feb-Oct. 2020.
- Supervising of a **student in art restoration** from INP (technical scientific protocol, L.-C. Lardeau) on “Of fibers and hairs: Study and conservation-restoration of Paul Poiret's "Tolède" dress (1921, Paris, Palais Galliera, fashion museum of the city of Paris). - Research of an adhesive for the stabilization of a tanned and dyed rabbit fur, intended for the Haute-Couture.”, Aubervilliers, Jan-Oct. 2020.
- Supervising of a **year 10 pupil** intern (observation internship on the profession of associate professor – A. Bouquerel), CRC, Paris, Dec. 2019
- Co-Supervising of a **PhD student** (B. Zuber) on “Sealants: study, valorization and rehabilitation of an essential element in the preservation of the wet collections of Sorbonne University”, CRC & Paris VI university, Paris, Nov 2019-Oct 2022.
- Supervising of a **student in art restoration** from INP (technical scientific protocol, P. Gamin) on “Conservation-restoration of two turtle specimens (XIX<sup>th</sup> century, Arles, Musée Réattu). Study of the impact of cold and heat desinsectisation treatments on biomaterials such as bones, scales and skin.”, Aubervilliers, Jan-Sept. 2019.
- Supervising of a Research Master intern (**M2** Chemistry) from ChimieParis Tech (B. Zuber) on “Permeability of sealants used in fluid collections of the Muséum national d' Histoire naturelle: towards better preservation of specimens”, CRC, Paris, Feb-Jul 2019.
- Supervising of a **HND** chemistry intern (BTS in chemistry) from ENCPB (Eva Roussel) on “Characterisation of sealants from the wet collections using FTIR and Py-GC/MS”, CRC, Paris, Oct-Dec 2018.
- Co-supervising of a Master's degree intern (**M1** Quaternary and Prehistory) from MNHN (M. Guernelec) on “Use of bone in medieval construction : Chronology and

- species used in the case of Notre-Dame de Senlis, Oise (12<sup>th</sup>-19<sup>th</sup> century).”, MNHN, Paris, Apr.-Jun 2018
- Supervising of a Master’s degree intern (**M2** Analytical chemistry) from University Paris VI (B. Maillat) on “Iron-protein interactions in the context of manuscript conservation”, CRC, Paris, Feb.-Aug. 2018.
  - Supervising of a Master’s degree intern (**M1** Quaternary and Prehistory) from MNHN (L. Le Meillour) on “Proteomics of archaeological caprine tooth from Leopard Cave site, Namibia.”, MNHN, Paris, Feb-Apr. 2016
  - Co-supervising of a Research Master intern (**M2** Chemistry) from UPMC (G.B.V Borges) on “Fishing areas in the Channel between coastline and high seas since 1000 : isotope analysis of bone collagen”, MNHN, Paris, Feb-Jun 2016.
  - Supervising of a Bachelor intern (**L3** Physics) from ENS Cachan School (A.-C. St Martin) on “TOF-SIMS Imaging of Mummy Skin”, C2RMF, Paris, Jun. 2011

### Memberships | Scientific Societies

- Society for the Preservation of Natural History Collections - SPNHC (2019,2020)
- International Council of Museums- ICOM (2018)
- Group of Multidisciplinary Methods Contributing to Archaeology - GMPCA (2017)
- French speaking Radiocarbon Network- REFRAIN (2014, 2015, 2016)
- French Mass Spectrometry Society-SFSM (2010, 2011, 2015, 2016)
- French Crystallography Society- AFC (2014)
- French Physics Society – SFP (2013-2014)

### Grants | To attend congresses

- AFC **young researcher grant** (French Association of Crystallography) grant (2014) to attend the 23<sup>rd</sup> IUCr 2014 conference in Montreal (Canada)
- SFSM **PhD student grant** (French Mass Spectrometry Society) to attend the - SIMS XVIII<sup>th</sup> conference in Riva del Garda (Italy).

### Funding | Research funding

- 2021 French national History **Museum Master's internship reward** for “Inventory of alterations to specimens mounted on microscopy slides: from documenting historical practices to cataloguing endangered specimens.” (4 months)
- 2020 French Heritage Science Foundation (**FSP**) research project for CollMi project “Collecting the microscopic: the conservation of mounting media” (70 000 €)
- 2020 French national History **Museum Master's internship reward** for “Inventory of degradations in wet collections: describe, document and classify for a better preservation.” (4 months)
- 2019 Funding of a **doctoral contract** of the Observatory of Heritage of Sorbonne University (**OPUS**) for “Sealants: study, valorization and rehabilitation of an essential element in the preservation of the wet collections of Sorbonne University” (100 000 €)
- 2019 French national History **Museum Thematic Priorities Funding** (ATM) for EffLuVe project “Efficiency of sealants with respect to evaporation in the fluid collections of the National Museum of Natural History” (2745 €)
- 2015 **ATM** “Mineral/Living beings interactions” for the DecorAtrice project: “Rational extraction and radiocarbon dating of bone collagen: application to the rare or invasive taxa and to the Collections” (7000 €)

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## ✂ ADDITIONAL SKILLS

### 🖥 Computer skills | Packages and scientific softwares

- Office software : confident user (Word, Excel, Power Point, One Note, Share point, Form, Foodle, Filesender)
- Scientific softwares: Mascot, Blast, ClustalW, Peaks, Byonics, Analyst, Data Explorer, GC Image, Origin, XRDUA, Fit2D, PyMca, Omnic, OPUS, INCA, SurfaceLab6, Diamond, MathCad, WxMaxima, Dialux, Wire, Thermotrack, JETI LiMeS, BWSpec, Engbird, AccessDB Viewer.
- Data treatment: FiTyk (refinements), ImageJ (images treatments), Multi-Ion SIMS, PLS\_toolbox (multivariate analysis), DiffractEVA, PDF4+ data base, PDFgetX2 and PDF getX3, PDFGui (PDF analysis and modelling), FullProf (Rietveld refinements).
- Pedagogical softwares : Data Studio, Igor, Synchronie
- Management software: Chemproduct, Geslab, Agate, Simbad,
- Video conferencing : Zoom, Microsoft Teams, Lifesize, Cisco Webex, GoToMeeting, WhatsApp, Skype, RendezVous, Renavisio
- FTP: Filezilla
- Bibliography management : Zotero, Endnote

### 😊 Languages | Written and spoken

- French: mother tongue.
- English: upper intermediate B2 level (940 points in TOEIC on Apr. 2007).
- German : working knowledge
- Italian and Latin : basic skills

### 🚗🎵 Interests | Volunteer experience, sports and hobbies

- **Volunteering work** in roman **archaeological excavations** and survey camps in France((Châteaubleau-Seine-et-Marne, Javols-Lozère, Fréjus-Var) and abroad (Campobello di Licata-Sicily)
  - **Dancing**: modern (1989-1999), ballroom dance (2001-2006, 2019-), folk and American contradances (2014- ).
  - Music : piano (1992-1999) and choir singing (1992-2003, 2014-2015, 2019)
  - **Travels** (tourism): Europe, United States, Canada, Australia, Mongolia, Russia, Maghreb countries.
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