



# J. Bianca Jackson

Monday July 22, 2019, by [admin-STEM](#)

## **2009 Chateaubriand STEM Fellow**

**University of Michigan, Ann Arbor - ENSTA- Ecole Polytechnique  
Applied Physics**

J. Bianca Jackson earned her PhD from the University of Michigan at Ann Arbor, and she was a Chateaubriand fellow in 2009 at the Laboratoire des Optiques Appliquées, ENSTA-Ecole Polytechnique for 8 months (4 years total).

### **In which field did you carry out your research for your PhD and what was your specific area of study?**

My degree is in applied physics, and my specific area of study was terahertz nondestructive evaluation.

### **What is your current occupation?**

I am an advanced optics engineer in the aerospace and defense industry.

### **Please give a brief description of the work you completed in France:**

While I was in France, I worked on developing applications of nondestructive, non-invasive terahertz imaging and spectroscopy for the study of cultural heritage artifacts with Prof. Gerard Mourou. While on the Chateaubriand fellowship, I was able to conduct preliminary experiments that allowed my host to obtain funding for a more extensive research program. While under the fellowship, I examined specimen from the oldest Neolithic human settlement, Catalhoyuk, and studied various historical pigments. I returned to France after my US component was complete, and was given the authority to develop a terahertz research facility at the Centre de la Recherche et de la Restauration des Musées de France (C2RMF).

### **How was your experience as a researcher in France?**

I enjoyed my research immensely, and had many opportunities to collaborate and present my work both in France and around Europe.

### **Comments on your experience as a researcher in France and conditions in your host lab:**

This Chateaubriand fellowship was invaluable to me, because there was very little initial funding for our project. I would not have been able to afford to move to France, evolve

### **Did or will your research in France lead to any co-publications?**

Yes

### **If yes, please describe (name of journal, date of publication):**

The following list includes all of my publications and co-publications based on the research I conducted while I was in France (inclusive of my fellowship period):

- J. B. Jackson, J. Labaune, R. Bailleul-Lesuer, L. D'Alessandro, A. Whyte, J. W. Bowen, M. Menu, and G. Mourou, "Terahertz pulse imaging in archaeology," *Frontiers of Optoelectronics*, 8 (2014) 81-92 (Special issue: Terahertz Wave Science, Technology, and Application)
- J. Bianca Jackson, John Bowen, Gillian Walker, Julien Labaune, Gerard Mourou, Michel Menu and Kaori

- Fukunaga, "A Survey of Terahertz Applications in Cultural Heritage Conservation Science," IEEE Transactions on Terahertz Science and Technology 1 (2011) 220-231 (inaugural issue, invited review)
- J.B. Jackson, M. Mourou, J. Labaune, J.F. Whitaker, I.N. Duling III, S.L. Williamson, C. Lavier, M. Menu and G.A. Mourou, "Terahertz Pulse Imaging for Tree-Ring Analysis: a Preliminary Study for Dendrochronology Applications" Measurement Science & Technology 20 (2009) 075502+10. (included in the IOP Select collection of articles)
  - A. S. Skryl, J. B. Jackson, M. I. Bakunov, M. Menu, and G. A. Mourou, "Terahertz time-domain imaging of hidden defects in wooden artworks: application to a Russian icon painting," Applied Optics 53 (2014) 1033-1038. (selected for republication in the OSA's Virtual Journal of Biomedical Optics 9:4 (2014))
  - G. C. Walker, J. W. Bowen, W. Matthews, S. Roychowdhury, J. Labaune, G. Mourou, M. Menu, I. Hodder, and J. B. Jackson, "Sub-surface terahertz imaging through uneven surfaces: visualizing Neolithic wall paintings in Çatalhöyük.," Optics Express 21 (2013) 8126-34
  - G. C. Walker, J. W. Bowen, J. Labaune, J. B. Jackson, S. Hadjiloucas, J. Roberts, G. Mourou, and M. Menu, "Terahertz deconvolution.," Optics Express 20 (2012) 27230-41
  - Julien Labaune, J. Bianca Jackson, Kaori Fukunaga, Jeffrey White, Laura d'Alessandro, Alison Whyte, Michel Menu and Gerard Mourou, "Investigation of Clay Artefacts with Terahertz," Applied Physics A: Materials Science and Processing 105 (2011) 5-9
  - J. Labaune, J.B. Jackson, S. Pagès-Camagna, I.N. Duling, M. Menu and G.A. Mourou, "Papyrus Imaging with Terahertz Time Domain Spectroscopy," Applied Physics A: Materials Science & Processing 100 (2010) 607-612

**Did you or one of your supervisors present your work at a seminar? Do you plan on doing so?**  
Yes

**If yes, please describe (name of seminar, date, type of presentation):**

The following list includes all of the oral presentations I have personally given based on the research I conducted while I was in France (inclusive of my fellowship period):

- "TISCH: Terahertz Imaging and Spectroscopy for Cultural Heritage," OSA Optical Sensors Meeting, July 2016, Vancouver, Canada
- "TISCH: Terahertz Imaging & Spectroscopy for Cultural Heritage," oral presentation at the 50th anniversary of the International Council on monuments and sites (ICOMOS) Seminar "Innovative technologies for heritage preservation," December 2015, Riga, Latvia
- "TISCH: Terahertz Imaging & Spectroscopy for Cultural Heritage," oral presentation at the Physical Sciences, Engineering and Computing Research Centre Seminar Series at Nottingham Trent University, October 2015, Nottingham, UK
- "Cyclododecane as a Reversible Contrast Enhancer for the Terahertz Imaging of Frescos," 2015 40th International Conference on Infrared, Millimeter, and Terahertz waves (IRMMW-THz), August 2015, Hong Kong, China
- "TISCH: Terahertz Imaging & Spectroscopy for Cultural Heritage," Women in Optics: The Castle Meeting, Schloss Rauischholzhausen, August 2015, Ebsdorfergrund, Germany
- "TISCH: Terahertz Imaging & Spectroscopy for Cultural Heritage," The Victoria & Albert Museum, July 2015, London, UK
- "Cyclododecane as a Reversible Contrast Enhancer for the Terahertz Imaging of Frescoes," in Conference on Subliming Surfaces: Volatile Binding Media in Heritage Conservation, April 2015, Cambridge, UK
- "TISCH: Terahertz Imaging & Spectroscopy for Cultural Heritage," Teranet Meeting, University of Leeds, January 2015, Leeds, UK
- "Cyclododecane As a Contrast Enhancing Agent for the Terahertz Imaging of Artworks" 1st International THz-Arte Workshop, ENEA-Frascati, Frascati, Italy, December 2014
- "TISCH: Terahertz Imaging & Spectroscopy for Cultural Heritage," Science & the Past Program for IUCA-Universidad de Zaragoza, November 2014, Zaragoza, Spain
- "Terahertz Time Domain Imaging and Spectroscopy for Cultural Heritage Conservation Science" Gordon Research Conference on Scientific Methods in Cultural Heritage Research, August 2014, Mount Snow, USA

- "Terahertz imaging and spectroscopy for cultural heritage conservation." 245th American Chemical Society National Meeting, New Orleans, USA, April 2013
- "Challenges Facing Terahertz Pulsed Reflectometry of Historical Architecture," 3rd European Optical Society Topical Meeting on Terahertz Science & Technology, June 2012, Prague, Czech Republic
- "High Average Power Lasers to Produce THz for Archeology," oral presentation for ICAN Workshop 2 & 3 - Driver & System for Peak Power Scaling, Friedrich Schiller Universität, June 2012, Jena, Germany
- "Terahertz Pulse Imaging of Egyptian and Near Eastern Artifacts," Advanced Electromagnetics Symposium, April 2012, Paris, France
- "Issues with Surface and Sub-Surface Measurements in the Terahertz Pulse Imaging of Heritage Objects," 3rd International Conference on Surface Metrology, March 2012, Annecy, France,
- "Terahertz Imaging and Spectroscopy for Cultural Heritage" SPIE Special Lecture at The University of Nizhny Novgorod, February 2012, Nizhny Novgorod, Russia
- "Terahertz pulse imaging of stratified architectural materials for cultural heritage studies," SPIE Europe International Symposium on Optical Metrology - O3A: Optics for Arts, Architecture, and Archaeology, June 2011, Munich, Germany
- "Pulsed Terahertz Investigation of Corroded and Mineralized Copper Alloy Historical Artifacts," 36th International Conference on Infrared, Millimeter, and Terahertz Waves, October 2011, Houston, USA
- "Nondestructive Terahertz Pulse Imaging for Cultural Heritage Conservation: A Survey," Proceedings of the European Optical Society Annual Meeting 2010 TOM 2 - Terahertz Science and Technology, October 2010, Paris, France
- "Portable Terahertz Pulse Imaging for Archaeology and Art Conservation," In Situ Technical Imaging for Art and Archaeology: A Symposium in Conservation Science, Andrew W. Mellon Symposium at the British Museum, July 2010, London, UK

**In your opinion, did the Chateaubriand Program contribute to closer ties between your US and French labs (why or why not)?**

Absolutely! I would not have been able further my research had I not obtained the Chateaubriand Fellowship. After I left France, I received a 2 year Marie Curie IntraEuropean Fellowship in the UK at a lab of a professor I met while I was part of the Chateaubriand Program. We continued to collaborate with others that I worked with while in France.

**Did you improve your French while in France?**

Un petit peu.

**Do you plan on returning to France in the future?**

I don't not have any immediate plans to return to France, but I am always open to if possible.

**Did you participate in any extracurricular activities or travel while in France?**

Yes, I traveled a great deal throughout France and Europe, particularly to collaborate with others or present my work.