Stanford

Benjamin Ofori Okai

Assistant Professor of Photon Science

Photon Science Directorate

Bio

ACADEMIC APPOINTMENTS

- Assistant Professor, Photon Science Directorate
- Principal Investigator, Stanford PULSE Institute

HONORS AND AWARDS

- Chemical & Engineering News Talented 12, American Chemical Society (2023)
- Panofsky Fellowship, SLAC National Accelerator Laboratory (2021)
- Henry A. Hill Graduate Research Fellowship, Massachusetts Institute of Technology (2015)
- National Science Foundation Graduate Research Fellowship, National Science Foundation (2011)
- Howard Douglass Moore Prize, Yale University (2009)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Executive Board, Yale Science and Engineering Alumni (2021 - present)
- Member, National Society of Black Physicists (2020 - present)
- Member, American Physical Society (2016 - present)

PROFESSIONAL EDUCATION

- PhD, Massacusetts Institute of Technology , Physical Chemistry (2016)
- S.M., Massachusetts Institute of Technology , Physical Chemistry (2013)
- B.Sc. (Int), Yale University , Chemistry (2009)

Teaching

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Samuel Sahel-Schackis

Postdoctoral Research Mentor

Eric Sung

Publications

PUBLICATIONS

- **Unveiling structural effects on the DC conductivity of warm dense matter via terahertz spectroscopy and ultrafast electron diffraction.** *Nature communications*

  Ofori-Okai, B. K., Descamps, A., Toro, E. R., Ikeya, M., Hansen, S. B., Mo, M., Baczewski, A. D., Brown, D., Fletcher, L. B., McBride, E. E., Shen, X., Weinmann, A., Yang, et al

  2025; 16 (1): 10541

- **Ultrafast multi-cycle terahertz measurements of the electrical conductivity in strongly excited solids.** *Nature communications*

  Chen, Z., Curry, C. B., Zhang, R., Treffert, F., Stojanovic, N., Toleikis, S., Pan, R., Gauthier, M., Zapolnova, E., Seipp, L. E., Weinmann, A., Mo, M. Z., Kim, et al

  2021; 12 (1): 1638

- **Dynamics of a Persistent Insulator-to-Metal Transition in Strained Manganite Films** *PHYSICAL REVIEW LETTERS*

  Teitelbaum, S. W., Ofori-Okai, B. K., Cheng, Y., Zhang, J., Jin, F., Wu, W., Averitt, R. D., Nelson, K. A.

  2019; 123 (26)

- **Toward quasi-DC conductivity of warm dense matter measured by single-shot terahertz spectroscopy**

  Ofori-Okai, B. K., Descamps, A., Lu, J., Seipp, L. E., Weinmann, A., Glenzer, S. H., Chen, Z.

  AMER INST PHYSICS.2018: 10D109

- **A terahertz pump mega-electron-volt ultrafast electron diffraction probe apparatus at the SLAC Accelerator Structure Test Area facility** *JOURNAL OF INSTRUMENTATION*

  Ofori-Okai, B. K., Hoffmann, M. C., Reid, A. H., Edstrom, S., Jobe, R. K., Li, R. K., Mannebach, E. M., Park, S. J., Polzin, W., Shen, X., Weathersby, S. P., Yang, J., Zheng, et al

  2018; 13

- **THz generation using a reflective stair-step echelon** *OPTICS EXPRESS*

  Ofori-Okai, B. K., Sivarajah, P., Huang, W., Nelson, K. A.

  2016; 24 (5): 5057–68

- **Observation of a mixed close-packed structure in superionic water.** *Nature communications*

  Andriambariarijaona, L., Stevenson, M. G., Bethkenhagen, M., Lecherbourg, L., Lefèvre, F., Vinci, T., Appel, K., Baehtz, C., Benuzzi-Mounaix, A., Bergermann, A., Bespalov, D., Brambrink, E., Cowan, et al

  2025

- **X-ray diffraction of metastable structures from supercooled liquid hydrogen.** *Scientific reports*

  Fletcher, L. B., Levitan, A. L., McBride, E. E., Kim, J. B., Alves, E. P., Aquila, A., Frost, M., Goede, S., King, G., Lane, T. J., Liang, M., MacDonald, M. J., Ofori-Okai, et al

  2024; 14 (1): 17283

- **Release dynamics of nanodiamonds created by laser-driven shock-compression of polyethylene terephthalate.** *Scientific reports*

  Heuser, B., Bergermann, A., Stevenson, M. G., Ranjan, D., He, Z., Lütgert, J., Schumacher, S., Bethkenhagen, M., Descamps, A., Galtier, E., Gleason, A. E., Khaghani, D., Glenn, et al

  2024; 14 (1): 12239

- **Giant Terahertz Birefringence in an Ultrathin Anisotropic Semimetal.** *Nano letters*

  Sie, E. J., Othman, M. A., Nyby, C. M., Pemmaraju, D., Garcia, C. A., Wang, Y., Guzelturk, B., Xia, C., Xiao, J., Poletayev, A., Ofori-Okai, B. K., Hoffmann, M. C., Park, et al

  2024

- **Evidence for phonon hardening in laser-excited gold using x-ray diffraction at a hard x-ray free electron laser.** *Science advances*

  Descamps, A., Ofori-Okai, B. K., Bistoni, O., Chen, Z., Cunningham, E., Fletcher, L. B., Hartley, N. J., Hastings, J. B., Khaghani, D., Mo, M., Nagler, B., Recoules, V., Redmer, et al

  2024; 10 (6): eadh5272

- **High deuteron and neutron yields from the interaction of a petawatt laser with a cryogenic deuterium jet** *FRONTIERS IN PHYSICS*

  Jiao, X., Curry, C. B., Gauthier, M., Chou, H. J., Fiuza, F., Kim, J. B., Phan, D. D., McCary, E., Galtier, E. C., Dyer, G. M., Ofori-Okai, B. K., Labun, L., Labun, et al

2023; 10

- **Ambient-temperature liquid jet targets for high-repetition-rate HED discovery science** *PHYSICS OF PLASMAS*

  Treffert, F., Glenn, G. D., Chou, H. J., Crissman, C., Curry, C. B., DePonte, D. P., Fiuza, F., Hartley, N. J., Ofori-Okai, B., Roth, M., Glenzer, S. H., Gauthier, M.

  2022; 29 (12)

- **Diamond formation kinetics in shock-compressed C–H–O samples recorded by small-angle x-ray scattering and x-ray diffraction.** *Science advances*

  He, Z., Rodel, M., Lutgert, J., Bergermann, A., Bethkenhagen, M., Chekrygina, D., Cowan, T. E., Descamps, A., French, M., Galtier, E., Gleason, A. E., Glenn, G. D., Glenzer, et al

  2022; 8 (35): eabo0617

- **Towards performing high-resolution inelastic X-ray scattering measurements at hard X-ray free-electron lasers coupled with energetic laser drivers** *JOURNAL OF SYNCHROTRON RADIATION*

  Descamps, A., Ofori-Okai, B. K., Baldwin, J. K., Chen, Z., Fletcher, L. B., Glenzer, S. H., Hartley, N. J., Hasting, J. B., Khaghani, D., Mo, M., Nagler, B., Recoules, Redmer, R., et al

  2022; 29: 931-938

- **Investigation of hard x-ray emissions from terawatt laser-irradiated foils at the Matter in Extreme Conditions instrument of the Linac Coherent Light Source** *JOURNAL OF INSTRUMENTATION*

  Fletcher, L. B., Curry, C. B., Gauthier, M., Glenn, G. D., Chen, Z., Cunningham, E., Descamps, A., Frost, M., Galtier, E. C., Heimann, P., Kim, J. B., Mo, M., Ofori-Okai, et al

  2022; 17 (4)

- **Ultrafast visualization of incipient plasticity in dynamically compressed matter.** *Nature communications*

  Mo, M., Tang, M., Chen, Z., Peterson, J. R., Shen, X., Baldwin, J. K., Frost, M., Kozina, M., Reid, A., Wang, Y., E, J., Descamps, A., Ofori-Okai, et al

  2022; 13 (1): 1055

- **Observation of a highly conductive warm dense state of water with ultrafast pump-probe free-electron-laser measurements** *MATTER AND RADIATION AT EXTREMES*

  Chen, Z., Na, X., Curry, C. B., Liang, S., French, M., Descamps, A., DePonte, D. P., Koralek, J. D., Kim, J. B., Lebovitz, S., Nakatsutsumi, M., Ofori-Okai, B. K., Redmer, et al

  2021; 6 (5)

- **High-resolution inelastic x-ray scattering at the high energy density scientific instrument at the European X-Ray Free-Electron Laser (vol 92, 013101, 2021)** *REVIEW OF SCIENTIFIC INSTRUMENTS*

  Wollenweber, L., Preston, T. R., Descamps, A., Cerantola, V., Comley, A., Eggert, J. H., Fletcher, L. B., Geloni, G., Gericke, D. O., Glenzer, S. H., Goede, S., Hastings, J., Humphries, et al

  2021; 92 (3)

- **High-resolution inelastic x-ray scattering at the high energy density scientific instrument at the Free-Electron Laser** *REVIEW OF SCIENTIFIC INSTRUMENTS*

  Wollenweber, L., Preston, T. R., Descamps, A., Cerantola, V., Comley, A., Eggert, J. H., Fletcher, L. B., Geloni, G., Gericke, D. O., Glenzer, S. H., Goede, S., Hastings, J., Humphries, et al

  2021; 92 (1)

- **An approach for the measurement of the bulk temperature of single crystal diamond using an X-ray free electron laser.** *Scientific reports*

  Descamps, A., Ofori-Okai, B. K., Appel, K., Cerantola, V., Comley, A., Eggert, J. H., Fletcher, L. B., Gericke, D. O., Gode, S., Humphries, O., Karnbach, O., Lazicki, A., Loetzsch, et al

  2020; 10 (1): 14564

- **Macroscopic Ionic Flow in a Superionic Conductor Na+ beta-Alumina Driven by Single-Cycle Terahertz Pulses** *PHYSICAL REVIEW LETTERS*

  Minami, Y., Ofori-Okai, B., Sivarajah, P., Katayama, I., Takeda, J., Nelson, K. A., Suemoto, T.

  2020; 124 (14)

- **Femtosecond Compression Dynamics and Timing Jitter Suppression in a THz-driven Electron Bunch Compressor** *PHYSICAL REVIEW LETTERS*

  Snively, E. C., Othman, M. K., Kozina, M., Ofori-Okai, B. K., Weathersby, S. P., Park, S., Shen, X., Wang, X. J., Hoffmann, M. C., Li, R. K., Nanni, E. A.

  2020; 124 (5)

- **Analysis of terahertz generation by beamlet superposition** *OPTICS EXPRESS*
  Ravi, K., Ofori-Okai, B. K., Nelson, K. A., Kaertner, F. X.
  2019; 27 (19): 26547–68

- **Dynamical Slowing-Down in an Ultrafast Photoinduced Phase Transition.** *Physical review letters*
  Zong, A., Dolgirev, P. E., Kogar, A., Ergeçen, E., Yilmaz, M. B., Bie, Y. Q., Rohwer, T., Tung, I. C., Straquadine, J., Wang, X., Yang, Y., Shen, X., Li, et al
  2019; 123 (9): 097601

- **Dynamical Slowing-Down in an Ultrafast Photoinduced Phase Transition** *PHYSICAL REVIEW LETTERS*
  Zong, A., Dolgirev, P. E., Kogar, A., Ergecen, E., Yilmaz, M. B., Bie, Y., Rohwer, T., Tung, I., Straquadine, J., Wang, X., Yang, Y., Shen, X., Li, et al
  2019; 123 (9)

- **Single-Shot Multi-Frame Imaging of Cylindrical Shock Waves in a Multi-Layered Assembly** *SCIENTIFIC REPORTS*
  Dresselhaus-Cooper, L., Gorfain, J. E., Key, C. T., Ofori-Okai, B. K., Ali, S. J., Martynowych, D. J., Gleason, A., Kooi, S., Nelson, K. A.
  2019; 9: 3689

- **Terahertz-based subfemtosecond metrology of relativistic electron beams** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*
  Li, R. K., Hoffmann, M. C., Nanni, E. A., Glenzer, S. H., Kozina, M. E., Lindenberg, A. M., Ofori-Okai, B. K., Reid, A. H., Shen, X., Weathersby, S. P., Yang, J., Zajac, M., Wang, et al
  2019; 22 (1)

- **THz-Pump UED-Probe on a Topological Weyl Semimetal**
  Sie, E. J., Nyby, C. M., Pemmaraju, C. D., Park, S., Shen, X., Yang, J., Hoffmann, M. C., Ofori-Okai, B. K., Li, R., Reid, A. H., Weathersby, S., Mannebach, E., Finney, et al
  IEEE.2019

- **An ultrafast symmetry switch in a Weyl semimetal.** *Nature*
  Sie, E. J., Nyby, C. M., Pemmaraju, C. D., Park, S. J., Shen, X. n., Yang, J. n., Hoffmann, M. C., Ofori-Okai, B. K., Li, R. n., Reid, A. H., Weathersby, S. n., Mannebach, E. n., Finney, et al
  2019; 565 (7737): 61–66

- **An Ultrafast Symmetry Switch in a Weyl Semimetal** *Nature*
  Sie, E. J., et al
  2019; 565, 61

- **Setup for meV-resolution inelastic X-ray scattering measurements and X-ray diffraction at the Matter in Extreme Conditions endstation at the Linac Coherent Light Source (vol 89, 10F104, 2018)** *REVIEW OF SCIENTIFIC INSTRUMENTS*
  McBride, E. E., White, T. G., Descamps, A., Fletcher, L. B., Appel, K., Condamine, F., Curry, C. B., Dallari, F., Funk, S., Galtier, E., Gamboa, E. J., Gauthier, M., Goede, et al
  2018; 89 (12): 129901

- **Setup for meV-resolution inelastic X-ray scattering measurements and X-ray diffraction at the Matter in Extreme Conditions endstation at the Linac Coherent Light Source**
  McBride, E. E., White, T. G., Descamps, A., Fletcher, L. B., Appel, K., Condamine, F. P., Curry, C. B., Dallari, F., Funk, S., Galtier, E., Gauthier, M., Goede, S., Kim, et al
  AMER INST PHYSICS.2018: 10F104

- **Two-Dimensional Spectroscopy at Terahertz Frequencies** *TOPICS IN CURRENT CHEMISTRY*
  Lu, J., Li, X., Zhang, Y., Hwang, H. Y., Ofori-Okai, B. K., Nelson, K. A.
  2018; 376 (1): 6

- **Modeling of THz Pump Induced Plasmonic Oscillations in Silicon Membranes**
  Wang, N., Nanni, E. A., Shen, X., Li, R. K., Hoffmann, M., Ofori-Okai, B. K., Zheng, Q., Yang, J., Wang, X. J., IEEE
  IEEE.2018

- **Rapid and precise determination of zero-field splittings by terahertz time-domain electron paramagnetic resonance spectroscopy** *CHEMICAL SCIENCE*
  Lu, J., Ozel, I., Belvin, C. A., Li, X., Skorupskii, G., Sun, L., Ofori-Okai, B. K., Dinca, M., Gedik, N., Nelson, K. A.
  2017; 8 (11): 7312–23

- **Self-referenced single-shot THz detection** *OPTICS EXPRESS*
  Russell, B. K., Ofori-Okai, B. K., Chen, Z., Hoffmann, M. C., Tsui, Y. Y., Glenzer, S. H.
  2017; 25 (14): 16140–50

- **Coherent Two-Dimensional Terahertz Magnetic Resonance Spectroscopy of Collective Spin Waves** *PHYSICAL REVIEW LETTERS*
  Lu, J., Li, X., Hwang, H. Y., Ofori-Okai, B. K., Kurihara, T., Suemoto, T., Nelson, K. A.
  2017; 118 (20): 207204

- **Broadband terahertz generation with a stair-step echelon**
  Ravi, K., Ofori-Okai, B. K., Sivarajah, P., Huang, W., Kaertner, F. X., Nelson, K. A., IEEE
  IEEE.2017

- **Nonlinear two-dimensional terahertz photon echo and rotational spectroscopy in the gas phase** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Lu, J., Zhang, Y., Hwang, H. Y., Ofori-Okai, B. K., Fleischer, S., Nelson, K. A.
  2016; 113 (42): 11800-11805

- **Transient terahertz photoconductivity measurements of minority-carrier lifetime in tin sulfide thin films: Advanced metrology for an early stage photovoltaic material (vol 119, 035101, 2016)** *JOURNAL OF APPLIED PHYSICS*
  Jaramillo, R., Sher, M., Ofori-Okai, B. K., Steinmann, V., Yang, C., Hartman, K., Nelson, K. A., Lindenberg, A. M., Gordon, R. G., Buonassisi, T.
  2016; 119 (24)

- **What is the Brillouin zone of an anisotropic photonic crystal?** *PHYSICAL REVIEW B*
  Sivarajah, P., Maznev, A. A., Ofori-Okai, B. K., Nelson, K. A.
  2016; 93 (5)

- **The impact of sodium contamination in tin sulfide thin-film solar cells** *APL MATERIALS*
  Steinmann, V., Brandt, R. E., Chakraborty, R., Jaramillo, R., Young, M., Ofori-Okai, B. K., Yang, C., Polizzotti, A., Nelson, K. A., Gordon, R. G., Buonassisi, T.
  2016; 4 (2)

- **Transient terahertz photoconductivity measurements of minority-carrier lifetime in tin sulfide thin films: Advanced metrology for an early stage photovoltaic material** *JOURNAL OF APPLIED PHYSICS*
  Jaramillo, R., Sher, M., Ofori-Okai, B. K., Steinmann, V., Yang, C., Hartman, K., Nelson, K. A., Lindenberg, A. M., Gordon, R. G., Buonassisi, T.
  2016; 119 (3)

- **Improvement of minority-carrier lifetime in tin monosulfide via substrate engineering**
  Chakraborty, R., Steinmann, V., Hempel, M., Rekemeyer, P., Ofori-Okai, B. K., Hartman, K., Youssef, A., Akey, A., Nelson, K. A., Gradecak, S., Kong, J., Buonassisi, T., IEEE
  IEEE.2016: 415–18

- **Circumventing Limitations of Tilted-pulse-front Terahertz Generation Using a Stair-step Echelon**
  Ravi, K., Ofori-Okai, B. K., Sivarajah, P., Huang, W., Kartner, F. X., Nelson, K. A., IEEE
  IEEE.2016: 3917–18

- **Visualization of guided and leaky wave behaviors in an indium tin oxide metallic slab waveguide** *OPTICS EXPRESS*
  Teo, S. M., Werley, C. A., Wang, C., Fan, K., Ofori-Okai, B. K., Zhang, X., Averitt, R. D., Nelson, K. A.
  2015; 23 (11): 14876–96

- **Invited Article: Single-shot THz detection techniques optimized for multidimensional THz spectroscopy** *REVIEW OF SCIENTIFIC INSTRUMENTS*
  Teo, S. M., Ofori-Okai, B. K., Werley, C. A., Nelson, K. A.
  2015; 86 (5): 051301

- **The homogenization limit and waveguide gradient index devices demonstrated through direct visualization of THz fields** *NEW JOURNAL OF PHYSICS*
  Sivarajah, P., Ofori-Okai, B. K., Teo, S. M., Werley, C. A., Nelson, K. A.
  2015; 17

- **Direct experimental visualization of waves and band structure in 2D photonic crystal slabs** *NEW JOURNAL OF PHYSICS*
  Ofori-Okai, B. K., Sivarajah, P., Werley, C. A., Teo, S. M., Nelson, K. A.

2014; 16

- **Imaging of Terahertz Fields and Responses**
  Ofori-Okai, B. K., Sivarajah, P., Teo, S. M., Werley, C. A., Nelson, K. A.
  edited by Liu, Z., Khoo, I. C., Psaltis, D.
  SPIE-INT SOC OPTICAL ENGINEERING.2014

- **Chemically assisted femtosecond laser machining for applications in LiNbO3 and LiTaO3** *APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING*
  Sivarajah, P., Werley, C. A., Ofori-Okai, B. K., Nelson, K. A.
  2013; 112 (3): 615–22

- **High-Resolution, Low-Noise Imaging in THz Polaritonics** *IEEE TRANSACTIONS ON TERAHERTZ SCIENCE AND TECHNOLOGY*
  Werley, C. A., Teo, S. M., Ofori-Okai, B. K., Sivarajah, P., Nelson, K. A.
  2013; 3 (3): 239–47

- **Spin properties of very shallow nitrogen vacancy defects in diamond** *PHYSICAL REVIEW B*
  Ofori-Okai, B. K., Pezzagna, S., Chang, K., Loretz, M., Schirhagl, R., Tao, Y., Moores, B. A., Groot-Berning, K., Meijer, J., Degen, C. L.
  2012; 86 (8)