

IMU-CDC Individual Research Travel Support Program

Activity Reporting Form

Name of Grantee: **Idowu Ademola OSINUGA**

Home Institution and Country of Grantee: **Federal University of Agriculture, Abeokuta, Nigeria**

Name of the Host: **Professor Predrag S. Stanimirovic**

Name of the Host Institution and Country: **University of Nis, Nis, Serbia**

Topic of the Research Activity: **Hybrid three-term quasi-Newton conjugate gradient methods**

Dates spent Center/Host Institution: **February 1 – March 31, 2022.**

- **Summary statement of major outcome of your visit:** The visit afforded me the opportunity of grasping an extensive view and up-to-date approach to the determination of acceleration parameters for some classes of conjugate gradient methods for the solution of nonlinear unconstrained optimization problems.
- **Brief description of your research activities during your research visit:** Due to COVID-19 restrictions most of my interactions with my host and research activities were virtual. However, we had regular meetings virtually and physically where we had useful deliberations on conjugate gradient theory and some techniques for handling of non-differentiable objective functions. I had opportunity during the research visit to present as a keynote speaker during an International Webinar organized by the Department of Mathematics, Punjabi University, Patiala (letter of appreciation is attached).
- **Students and post-doctoral fellows advised:** A PhD student from Greece, by name Spyridon D. Mourtas, was interacted with on the subject and Prof. Lev Kazakovtsev (Department of Digital Control Systems, Siberian Federal University, Krasnoyarsk, Russia) who visited during the period.
- **Joint activities with your host:** Based on regular meetings, we brainstormed and identified two specific research projects for possible publications.
- **Research in progress (as a result from the visit):** There is ongoing research on the determination of acceleration parameters with the aid of reconstruction techniques in both gradient descent and conjugate gradient algorithms aside mean and Taylor's series expansion.
- **Papers published or in preprint form as a result from the research visit:** We are already putting together paper titled "Efficient Broyden-Fletcher-Goldfarb-Shanno conjugate gradient algorithms for the solution of unconstrained optimization" for publication in a journal. Another manuscript titled "Another hybrid BFGS-conjugate gradient algorithm for unconstrained optimization" is being finalized for submission after presentation in a virtual conference.
- **Planned future activities as a result of your research visit:** The planned future activities as a result of my visit are to extend our techniques to time varying optimization problems and further consideration of real life applications in compressed sensing, machine learning, etc. Also, we plan to continue our collaborative research work after the visit.

Signature:



07/04/2022