NAME: Joseph Kojo Ansong

ADDRESS: Department of Mathematics,
University of Ghana (Legon),
P.O. Box LG 62, Legon-Accra, Ghana.

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CITIZENSHIP Ghanaian

EDUCATION

DATE	DEGREE/QUALIFICATION	INSTITUTION
November 19, 2009	PhD (Applied Mathematics)	University of Alberta (Canada)
June 20, 2003	MSc (Engineering Mathematics)	University of Twente (The Netherlands)
August 31, 1999	BSc (Mathematics)	University of Cape Coast (Ghana)

POST-DOCTORAL FELLOWSHIPS

2011–2015 Postdoctoral Fellow, Department of Earth & Environmental Sciences, University of Michigan, USA. **Postdoctoral host:** Professor Brian K. Arbic

Official Postdoc of the Climate Process Team (CPT; http://www-pord.ucsd.edu/∼jen/cpt/)
The CPT was created to develop, test, and implement dynamically appropriate parameterizations for diapycnal mixing due to internal-wave breaking for use in global climate models. It was funded by the National Science Foundation (NSF; USA), and led by Prof. Jennifer MacKinnon (Scripps).

2010–2011 Postdoctoral Fellow, Department of Physics, University of Alberta, Canada. **Postdoctoral host:** Professor Bruce Sutherland

Conducting fluid dynamics research in a physical laboratory and mentoring undergraduate students in the lab.

ACADEMIC APPOINTMENTS AND AFFILIATIONS:

DATE	POSITION	INSTITUTION
Sept 1, 2020–present	Senior Lecturer	University of Ghana, Department of Mathematics
August 1, 2017–Sept. 1, 2020	Lecturer	University of Ghana, Department of Mathematics

PREVIOUS ACADEMIC AND RESEARCH APPOINTMENTS:

DATE	POSITION	INSTITUTION
May 1, 2015– July 31, 2017	Assistant Research Scientist	University of Michigan (USA)
2000–2001	Mathematics Teacher	Kintampo Senior High School (Ghana)
1999–2000	Teaching Assistant	University of Cape Coast (Ghana)

COMMITTEE MEMBERSHIPS

2019-present Departmental Teaching Assessment Committee (DTAC) Member, UG.

2019-present Post-Graduate Committee Member, Department of Mathematics, UG.

2019/2020 Course Adviser (Level 100), Department of Mathematics, UG.

MANUSCRIPT REVIEWS

2011-present Reviewer of proposals for the National Science Foundation (NSF; USA); *about one per year.*

2011-present Reviewer of manuscripts for scientific journals:
1. Journal of Fluid Mechanics *(2011-present; about 1 per year)*
2. Ocean Modeling *(2014-present; about 1 per year)*
3. Journal of Physical Oceanography *(2017-present; about 1 per year)*
4. Geophysical Research Letters *(2018-present; about 1 per year)*

AWARDS AND HONORS

2007 Graduate Student Teaching Award, University of Alberta (Canada)

2007 Josephine Mitchell Scholarship (in conjunction with Graduate Student Teaching award), University of Alberta (Canada)

2000 Overall Best Graduating Student, University of Cape Coast, (Unilever Ghana Award). **Scholastic:** GPA= 3.9/4

PROFESSIONAL SOCIETY MEMBERSHIPS

American Mathematical Society (AMS)

COMMUNITY SERVICE

1. Fellow, Commonwealth Hall, University of Ghana.

2. Deacon, Praise Temple Assemblies of God Church, Westland, Accra.

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CURRENT RESEARCH FOCUS

Part of my current research focus is on using mathematical theories and numerical models to understand geophysical flows with practical applications; such as Coastal Upwelling along the Gulf of Guinea (which encompasses the coast of Ghana). Upwelling is a seasonal oceanographic event in which nutrient-rich cool water from below the ocean moves to the surface, leading to an increase in fishing activities along the coast. An interesting scientific question is: "what are the dynamic processes that lead to upwelling along the Gulf of Guinea?" This question is presently being investigated by my PhD student, Patrick Dwomfuor. In a similar vein, I am interested in using dynamical systems theories and mathematical models to study Lagrangian Coherent Structures (LCS) with a motivation to understand the dispersion of pollutants in the ocean, such as oil spills. A preliminary study of LCS has been done by my previous MPhil student, Cyril Amengor. Finally, I am developing numerical tools for analyzing vehicular traffic in some principal streets of Accra with the view to using a mathematical approach to help ease traffic congestion. The analysis of traffic flow in the Legon Bypass and Okponglo roads is currently being pursued by my MPhil student, Simon Kemausour Narh.

TEACHING

a. ***Undergraduate:***

2017-2019	FAEN 101 (Algebra for Engineering students), University of Ghana
2017-2019	Math 223 (Calculus II), University of Ghana
2018-2020	Math 126 & Math 221 (Algebra & Geometry), University of Ghana
2017-2020	Math 450 (Differential Equations II), University of Ghana
2018-2019	Math 350 (Differential Equations I), University of Ghana
2018-2019	Math 355 (Calculus of Several Variables), University of Ghana
2007-2008	Math 101 (Calculus for engineers), University of Alberta, Canada.
2000–2001	Mathematics, Kintampo Senior Secondary School, Ghana.
1995–1996	Mathematics, Damongo Senior Secondary School, Ghana.
1994–1995	Mathematics & General Science, Buipe Junior Secondary School; Ghana National Service

Teaching Assistant (Undergraduate):

2008–2009	Math 201 (Differential equations), University of Alberta

2006–2007	Math 101 (Calculus I), University of Alberta Math 201 (Differential equations), University of Alberta
2005–2006	Math 101 (Calculus I), University of Alberta Math 201 (Differential equations), University of Alberta
2004–2005	Math 113 (Calculus I), University of Alberta Math 100 (Calculus I for engineers), University of Alberta Math 101 (Calculus I for engineers), University of Alberta
1999–2000	Undergraduate mathematics tutorials, University of Cape Coast; Ghana National Service.

b. ***Post-graduate:***

2017-2020	Math 676 (Numerical Methods for PDEs), University of Ghana
2017-2018	Math 639 (Ordinary Differential Equations), University of Ghana.
2018-2020	Math 731 (Mathematical Modeling and Biological Systems), University of Ghana
2014-2015	One-month course in Computational Fluid Dynamics, KNUST (Deptartment of Mechanical Engineering)

GRADUATE STUDENT THESIS COMMITTEE MEMBER

2017–present	Atchu Bennet Foli, PhD Candidate, University of Ghana; Department of Marine and Fisheries Science.
2018-present	Gloria Agyeiwaa Botchway, PhD Candidate, University of Ghana; Department of Mathematics.

GRADUATE STUDENT THESIS SUPERVISOR

2017–present	Patrick Dwomfuor; PhD student, University of Ghana; Dept. of Math
2018–present	Kemausour Simon Narh; MPhil student, University of Ghana; Dept. of Math
2018–2019	Michael Kwame Biney; MPhil, University of Ghana; Department of Marine and Fisheries Science.
2017–2018	Cyril Amengor Makafui; MPhil, University of Ghana; Dept. of Math

UNDERGRADUATE STUDENT RESEARCH SUPERVISOR

2018–2019 Brown Molenaar John; University of Ghana, Department of Mathematics.

LECTURESHIP/SEMINAR AND VISITING PROFESSORSHIP

2013 (Oct. 23) Invited by Dr. Eric Kunze (Fellow of American Geophysical Union (AGU) and winner of AGU's James B. Macelwane Medal) to give a talk on 'Geographical distribution of PSI in a global ocean model', University of Washington, Seattle, USA

INVITATION TO NATIONAL AND INTERNATIONAL CONFERENCES AND WORKSHOPS

2020 Joseph K. Ansong, Ocean Sciences Meeting, "Importance of damping in comparison of internal tides in several global hydrodynamical models with altimetry", San Diego, USA, 16-21 February, 2020.

2015 Joseph K. Ansong, NSF Climate Process Team (CPT) Meeting, "Energy fluxes in the HYCOM ocean model", San Diego, California, October 27-29.

2014-present Co-organizer of the Coastal Ocean and Environment Summer School in Ghana (COESSING). "Introduction to Ocean Modeling", Partner institutions: Legon, RMU, UCC and KNUST.

2014 Joseph K. Ansong, NSF Climate Process Team (CPT) meeting: "Energy Fluxes in the HYCOM ocean model", January 12-15.

2013 Invited by Prof. George Philander (Princeton University) to attend the "Habitable Planet Workshop" in Nairobi, Kenya. *The goal is to get young Africans interested in Science via a workshop on Earth Systems Science. Students learn about why the Earth is habitable from different subject areas: Ocean/Atmosphere circulation, Paleoclimate, Modeling, Climate change, Biodiversity, etc*, July 1-10.

2013 Joseph K. Ansong, NSF Climate Process Team (CPT) meeting: "Geographic distribution of Diurnal and Semidiurnal Parametric Subharmonic Instability in Ocean Circulation Model". Boulder, Colorado, USA, March 5-7.

2013 Joseph K. Ansong, Layered Ocean Model Workshop: "Geographic distribution of PSI in Ocean Circulation Model". Ann Arbor, USA, May 21-23.

2010 Joseph K. Ansong, Wave Phenomena IV: Waves in fluids from the microscopic to the planetary scale, "Plumes in stratified environments", University of Alberta, June 14-18.

2007 Joseph K. Ansong, "Plumes in stratified environments", PIMS Workshop on Plumes and Gravity Currents, University of Alberta, October 5-7.

2007 Joseph K. Ansong "Fountains impinging on a density interface", Department of Mathematics, University of Alberta, Canada, April 10.

2007 Joseph K. Ansong, PIMS Conference on gravity currents, "Plumes generating internal gravity waves", University of British Columbia, January

2007 Joseph K. Ansong "Plumes in stratified environments", summer school on Tropical Multiscale Convective Systems: Theory, Modeling, and Observation, University of Victoria, Canada, July 28-August 5.

2006 Joseph K. Ansong "Fountains impinging on a density interface", 8th Symposium on Research in Geosciences, University of Alberta, Canada, October 12.

2006 Joseph K. Ansong, Young Researchers Conference, "Theory of plumes", University of Calgary, Canada, April.

PUBLICATIONS

Contribution to book chapter

15. Arbic, B.K., Alford, M.H., **Ansong, J.K.**, Buijsman, M.C., Ciotti, R.B., Farrar, J.T., Hallberg, R.W., Henze, C.E., Hill, C.N., Luecke, C.A., Menemenlis, D., Metzger, E.J., Mller, M., Nelson, A.D., Nelson, B.C., Ngodock, H.E., Ponte, R.M., Richman, J.G., Savage, A.C., Scott, R.B., Shriver, J.F., Simmons, H.L., Souopgui, I., Timko, P.G., Wallcraft, A.J., Zamudio, L., & Zhao, Z. (2018). A Primer on Global Internal Tide and Internal Gravity Wave Continuum Modeling in HYCOM and MITgcm. In: *New Frontiers in Operational Oceanography.* E. Chassignet, A. Pascual, J. Tintore, and J. Verron, Eds., GODAE OceanView, 307-392, Chap 13, doi:10.17125/gov2018.ch13.

Published Research Work in Refereed Journals

14 Buijsman M. C., G. R. Stephenson, **J. K. Ansong**, B. K. Arbic, J.A. M. Green, J. G. Richman, J. F. Shriver, C. Vic, A. J. Wallcraft, Z. Zhao. (2020). On the interplay between horizontal resolution and wave drag and their effect on tidal baroclinic mode waves in realistic global ocean simulations. *Ocean Modelling, 152, doi: 10.1016/j.ocemod.2020.101656*

13 Luecke C.A., B.K. Arbic, J.G. Richman, J.F. Shriver, M.H. Alford, **Joseph K. Ansong**, S.L. Bassette, M.C., Buijsman, D. Menemenlis, R.B. Scott, P.G. Timko, G. Voet, A.J. Wallcraft, and L. Zamudio. (2020) Statistical Comparisons of temperature variance and kinetic energy in global ocean models and observations: Results from mesoscale to internal wave frequencies. *Journal of Geophysical Research: Oceans, 125 (5), doi: 10.1029/2019JC015306*

12. Janet S., Gordon, A.L., Wijffels, S.E., Feng, M., Hu, S., Koch-Larrouy, A., Phillips, H.E., Nugroho, D., Napitu, A., Pujiana, K., Susanto, R.D., Sloyan, B.M., Yuan, D., Riama, N.F., Siswanto, S., Kuswardani, A., Arifin, Z., Wahyudi, A.J., Zhou, H., Nagai, T., **Ansong, J.K.**, Bourdalle-Badie, R., Chanut, J., Lyard, F., Arbic, B.K., Ramdhani, A., & Setiawan, A. (2019). Detecting Change in the Indonesian Seas. *Frontiers in Marine Science 6:257, doi: 10.3389/fmars.2019.00257.*

12* Janet S., Gordon, A.L., Wijffels, S.E., Feng, M., Hu, S., Koch-Larrouy, A., Phillips, H.E., Nugroho, D., Napitu, A., Pujiana, K., Susanto, R.D., Sloyan, B.M., Yuan, D., Riama, N.F., Siswanto, S., Kuswardani, A., Arifin, Z., Wahyudi, A.J., Zhou, H., Nagai, T., **Ansong, J.K.**, Bourdalle-Badie, R., Chanut, J., Lyard, F., Arbic, B.K., Ramdhani, A., & Setiawan, A. (2019). Corrigendum: Detecting Change in the Indonesian Seas. *Frontiers in Marine Science 6:257, doi: 10.3389/fmars.2019.00257.*

11. **Ansong, J.K.**, Arbic, B.K., Simmons, H.L., Alford, M.H., Timko, P.G., Metzger, E.J., Shriver, J.F., & Wallcraft, A.J. (2018). Geographic distribution of diurnal and semidiurnal parametric subharmonic instability in a global ocean circulation model. *Journal of Physical Oceanography*, 48, 1409-1431, doi:10.1175/JPO-D-17-0164.1.

10. Savage, A.C., Arbic, B.K., Alford, M.H., **Ansong, J.K.**, Farrar, J.T., Menemenlis, D., O'Rourke, A.K., Richman, J.G., Shriver, J.F., Voet, G., Wallcraft, A.J., & Zamudio, L. (2017). Spectral decomposition of internal gravity wave sea surface height in global ocean models. *Journal of Geophysical Research*, 10, 122, 7803-7821, doi:10.1002/2017JC013009.

9. MacKinnon, J.A., Zhao, Z., Whalen, C.B., Waterhouse, A.F., Trossman, D.S., Sun, O.M., St. Laurent, L.C., Simmons, H.L., Polzin, K., Pinkel, R., Pickering, A., Norton, N.J., Nash, J.D., Musgrave, R., Merchant, L.M., Melet, A.V., Mater, B., Legg, S., Large, W.G., Kunze, E., Klymak, J.M., Jochum, M., Jayne, S.R., Hallberg, R.W., Griffies, S.M., Gent, P., Diggs, S., Danabasoglu, G., Chassignet, E.P., Buijsman, M.C., Bryan, F.O., Briegleb, B.P., Barna, A., Arbic, B.K., **Ansong, J.K.** & Alford, M.H. (2017). Climate process team on internal-wave driven ocean mixing. *Bulletin of the American Meteorological Society (BAMS)*. doi:10.1175/BAMS-D-16-0030.1.

8. **Ansong, J.K.**, Arbic, B.K., Buijsman, M.C., Alford, M.H., Zhao, Z., Simmons, H.L., Timko, P.G., Richman, J.G., Metzger, E.J., Shriver, J.F., & Wallcraft, A.J. (2017). Semidiurnal internal tide energy fluxes and their variability in a global ocean model and moored observations. *Journal of Geophysical Research*, 3, 122, 1882-1900, doi:10.1002/2016JC012184.

7. Timko, P.G., Arbic, B.K., Go, J.A., **Ansong, J.K.**, Smith, W.H.F., Melet, A. & Wallcraft, A.J. (2017). Impact of synthetic abyssal hill roughness on resolved motions in numerical global ocean tide models. *Ocean Modelling*, 112, 1-16, doi:10.1016/j.ocemod.2017.02.005.

6. Buijsman, M.C., **Ansong, J.K.**, Arbic, B.K., Richman, J.G. Shriver, J.F., Timko, P.G., Wallcraft, A.J., Whalen, C.B., & Zhao, Z. (2016). Impact of parameterized internal wave drag on the semidiurnal energy balance in a global ocean circulation model. *Journal of Physical Oceanography*, 46, 1399-1419, doi:10.1175/JPO-D-15-0074.1.

5. **Ansong, J.K.**, Arbic, B.K., Buijsman, M.C., Richman, J.G., Shriver, J.F. & Wallcraft, A.J. (2015). Indirect evidence for substantial damping of low-mode internal tides in the open ocean. *Journal of Geophysical Research: Oceans*, 9, 120, 6057-6071, doi:10.1002/2015JC010998.

4. Sutherland, B.R., Lee, B. & **Ansong, J.K**. (2012). Light attenuation experiments on double diffusive plumes and fountains. *Physics of Fluids*, 24, doi:10.1063/1.4730431.

3. **Ansong, J.K.**, Anderson-Frey, A. & Sutherland, R.R. (2011). Turbulent fountains in one- and two-layer cross flows. *Journal of Fluid Mechanics*, 689, 254-278.

2. **Ansong, J.K.**, & Sutherland, B.R. (2010). Internal gravity waves generated by convective plumes. *Journal of Fluid Mechanics*, 648, 405-434.

1. **Ansong, J.K.**, Kyba, P., & Sutherland, B.R. (2008). Fountains impinging on a density interface. *Journal of Fluid Mechanics*, 595, 115-139.

OTHER ACADEMIC WORKS (THESIS):

2009 **Ansong, J.K.**, "Plumes in Stratified Environments", *Ph.D. Thesis*, University of Alberta.