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### **Diola Bagayoko, Ph.D.**

**Southern University System Distinguished Professor of Physics, Director,** the Timbuktu Academy and the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP), **Dean,** the Dolores Margaret Richard Spikes Honors College, **Southern University and A&M College in Baton Rouge (SUBR).**

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**Web Page:** <http://www.phys.subr.edu/PhysicsCurrent/faculty/bagayoko/>

## **A1. EDUCATION AND EMPLOYMENT**

### **Education**

- *Philosophy doctorate (Ph.D.),* Louisiana State University (LSU), Baton Rouge, Louisiana, 1983, Theoretical Solid State Physics, i.e., Condensed Matter Theory.
- *Master's degree (MS),* Solid State Physics, Lehigh University, Bethlehem, PA, 1978.
- *BS, Physics and Chemistry,* Ecole Normale Supérieure (ENSUP) de Bamako, Bamako, Mali, 1973.
- *Formal training in the theory and practice of Teaching and Learning,* ENSUP, 1969-1973.

### **Employment**

**Dean, the Dolores Margaret Richard Spikes Honors College (2015-Present).**

**Southern University System Distinguished Professor of Physics** (1999-present) and Chancellor's Fellow (SUBR Distinguished Professor called Chancellor's Fellow, 1994-present), SUBR;

**Director,** the Timbuktu Academy (1990-Present)

**Director,** Master's Degree Program in Physics (1996-present);

**Associate Director,** the Louisiana Space Consortium (1992-2005) and the Louisiana Space Grant (2005-present);

**Adjunct Professor of Mathematics and Science Education** (2002-Present); **Chairman** of the Department of Physics (January 2009 to July 2015) Associate Professor of Physics, SUBR (1989-1994); Assistant Professor of Physics, SUBR (1984-89); Physics Lecturer, University of Benghazi, Libya (1983-84); Research and Graduate Assistant, LSU (1978-1983); High School Physics and Chemistry teacher, Sikasso High School, Sikasso, Mali (1973-1975).

## **A2. TEACHING AND MENTORING ACCOMPLISHMENTS**

### **General Teaching and Course Development**

Bagayoko Teaches and has taught courses in Introductory Physics, Mathematical Physics, Classical, Relativistic, and Quantum Mechanics. Developed or enhanced several courses, the most recent of which deals with the Global Learning and Observations to Benefit the Environment (GLOBE) and the Implementation of Standard-based Science and Mathematics Reform (2001). Bagayoko developed many of the courses for the Master Degree Program in Physics and many of the ones for the Science/Mathematics Education Ph.D. degree program. These course and syllabus developments and enhancements (undergraduate and graduate) explicitly take into account the taxonomy of the cognitive domain, recent research findings on cognition, and standards of graduate schools and of high technology industries. In

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#### **Ph.D. Dissertation Direction:**

*“Misconceptions in Astronomy: Conceptual Change Through a constructivist Approach.”* Graduate Student (**Now Dr.**): Troy D. Williams. Date of Graduation: December 2005. Dissertation Research Director: D. Bagayoko.

*“Calculus Misconceptions Held by Students at A Historically Black College and University in the Southeast of the United States.”* Graduate Student (**Now Dr.**): Phakaporn Lewchalermvongs. Graduation Date: May 2015

#### **Master’s of Science Theses**

Directed the Master’s Theses of seven (7) students from 2010 to present: John Ejembi, Humphrey Ifeanyi, Bethuel Khamala, Augusting M’Bolle, Cheick Omar Bamba, Dipendra Banjara, and Uttan Bhandari. Theses directed before 2010 follow.

*“Density Functional Description of Electronic and Related Properties of Wurtzite Cadmium Sulfide (*w-CdS*), Cubic CdS, and Ferroelectric  $\text{NaN}_2$ ”* Graduate student: E Chinedu Ekuma, Graduation date, July 2009. Thesis Directors: D. Bagayoko (lead), G. L. Zhao, and J. T. Wang

*“The BZW Method and the Electronic Properties of Zinc Selenide (*ZnSe*)”* Graduate Student: Ms. LaShounda Torrence-Franklin. Date of Graduation: May 2001. Director: D. Bagayoko, Ph.D.

*“Ab-initio Computation for the Electronic Structure of Wurtzite Aluminum Nitride.”* Graduate Student: Mr. Luo Yixin. Date of Graduation: December 2000. Director: Diola Bagayoko, Ph.D., and G. L. Zhao, Ph.D.

*“Optimization Studies of Polymer Electrolyte Fuel Cell Performance in the Presence of Reformate Gas in the Anode Feedstream.”* Graduate Student: Mr. Tommy Rockward. Graduation Date: December 1998. Director: Diola Bagayoko, Ph.D.

*“The Electronic Structure and Optical Properties of Ruthenium Dioxide.”* Graduate Student: Mr. Troy. D. Williams. Date of graduation: July 31, 1998. Director: Diola Bagayoko, Ph.D.

*“The Electronic, Magnetic, and Structural Properties of  $\text{Al}_{18}\text{Fe}$ .”* Graduate Student: Ms. LaKindra P. Francis. Date of Graduation: July 31, 1998. Director: Diola Bagayoko, Ph.D.

#### **Bachelor of Science –Honors Theses**

*“Electronic and Related Properties of Indium Phosphide (*InP*)”* Student: Ms. Cacey Stevens (2008). Director: Diola Bagayoko

*“Optimization and Spectrophotometric comparisons of Radiochromic Dye (2,3,5-Triphenyl-2H-Tetrazolium chloride) in Gelatin and Agar Models.”* Student: LaKindra P. Francis. Date of graduation: May 1997. Co-directors: Diola Bagayoko, Dr. Lisa Karam (NIST, Physics Laboratory, Gaithersburg, MD), and Dr. Ella L. Kelley.

*“Electronic Properties of  $\text{Al}_{18}\text{Fe}$ .”* Student: Wilson Sheppard Date of graduation: May 1994. Director: Diola Bagayoko.

#### **Thesis Committee Service (documentation of actual services is available)**

Served on the thesis committees of the following Master’s degree students whose graduation dates are given in parentheses: Anthony Cochran (May 1998); Lan Zhou (7/31/1998), Ke Yu (7/31/1998), Isiaka Akanbi (7/31/1998), Manford Chinkhota (7/31/1998), LaShondria Dixon (7/31/1998), and Sundara Ghatty (2009).

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**Recruitment and Systemic Mentoring: The Timbuktu Academy** (*Recipient of the 2002 US Presidential Award for Excellence*; <http://www.phys.subr.edu/timbuktu.htm>)

Bagayoko personally supervised the research of an average of six (6) physics majors, per year, from 1989 to 2001. Served as academic advisor or mentor for seven (7) student **grand marshals** of SUBR: **Ms. Zelda Gills, spring 1989**, African-American and now holding a Ph.D. in physics from Georgia Tech; **Mr. Billy Vegara, a Hispanic American, Spring 1992**, US Navy; **Mr. Michael Ashenafi, Spring 2002**, enrolled in medical Physics graduate program at LSU; **Mr. Anthony Pullen**, Spring 2004, in the Physics Ph.D. program at Caltech; **Mr. Divine Kumah**; Summer 2004, in the Applied Physics Ph.D. program at the University of Michigan, Ann Arbor; **Ms. Cacey Stevens** who earned her Ph.D. in Physics from The University of Chicago; and **Mr. Ronald Alexander** who is pursuing his Ph.D. in Physics from Harvard University.

Bagayoko established the nationally recognized **Timbuktu Academy** in 1990-91, with the financial support of the National Science Foundation (RCMS Program) and the Louisiana Board of Regents. In 1993, he was joined by co-directors Dr. Ella L. Kelley and Dr. Reza Mirshams to expand the Academy to Chemistry and Engineering, in addition to pPhysics. *A major funding from the Department of the Navy, Office of Naval Research (ONR), expanded the Academy in 1993 to "mentor one hundred (100) pre-college students per summer, fifty (50) high achieving college students majoring in physics, engineering, and chemistry, and to affect, positively, hundreds of pre-college and college students and their parents per year."* Recruited and mentored, thanks to additional funding from NASA, NIST, NSF, and SUBR, additional physics, engineering, and chemistry majors per year, including five (5) NASA-USRP scholars. *About 93% of these scholars are African-Americans; the others are Hispanic, White, and Asian Americans.*

*He initiated, through local, regional, and national publications and presentations; a wide replication of the Timbuktu Academy, including in all science, technology, engineering, and mathematics (STEM) units at SUBR. He did similarly in the State of Louisiana through the Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) for which he is one of the principal investigators from 1995 to present. He has been the Statewide Director of LS-Lamp from 2003 to present. The paradigm, objectives, activities, diversified funding base, programs, and selected results of the Timbuktu Academy are available on the World Wide Web at <http://www.phys.subr.edu/timbuktu.htm>. Based on the strength of the undergraduate program, the Louisiana Board of Regents approved the M.S. degree program in physics effective in the fall of 1996. *The Graduate Component of the Timbuktu Academy was established and it secured seven (7) superior graduate fellowships, from a competitive state-funding program.**

A greater appreciation of what we refer to as mentoring is available in Education, Vol.115, No.1, November 1994 in a series of three (3) articles co-authored by Bagayoko. **These papers and others place the creation of educational value added on a scientific footing.** *The actual results, in terms of graduates and their pursuit of Ph.D. degrees, the production of new knowledge by the Scholars, and their scholastic accomplishments are available at the web site noted above.* From 1989 to present, groups of 5 to 27 undergraduate scholars attended the national NCBPS and NSBP conferences every year. From 1993 to present, others (2-9) attended NSBE, NCUR, ASEE/GSW, APS, and ACS conferences. Per year, 35-50 scholars attend and 5-15 present at these conferences.

**A3. NARRATIVE SUMMARY OF RESEARCH ACCOMPLISHMENTS: over 190 publications**

- **Over one hundred thirty (130)** mostly technical, refereed publications deal with condensed matter theory (electronic, cohesive, magnetic, optical, and other properties of metals, semiconductors, oxides, clusters, and carbon nanotubes). In 1998, Bagayoko and colleagues *introduced the Bagayoko, Zhao, and Williams (BZW) method that solved a 50 years old band gap problem in physics. This method was enhanced by Bagayoko's former students, Ekuma and Franklin (EF), to become the BZW-EF method.*

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- This method opened the way, for the first time, to *predictive* calculations of electronic and related properties of semiconductors [Bull. Amer. Phys. Soc., Vol. 43, No. 1, p. 846 (1998); J. Phys.: Condensed Matter, Vol. 10, pp. 5645-5655 (1998); Physical Review B60, pp. 1563-1572 (1999)]. In 2014, Bagayoko presented the correct understanding of density functional theory (DFT) and completed the theory in practice [AIP Advances 4, 127104 (2014).] **This last publication corrected a 50 years old misunderstanding in theoretical physics. It provided the tool for the attainment of the Objectives of the Materials Genome Initiative (MGI) of President Barak Obama – as far as theory correctly informing and guiding the design and fabrication of devices is concerned.**
- **Over 60 publications deal with teaching, mentoring, and learning (TML).** With three of these publications, *Bagayoko and colleagues have placed systemic mentoring on a rigorous scientific footing.* Bagayoko and Kelley *introduced* an extension and several applications of the power law of human performance and *introduced* the concept of *cognitive condensation* in teaching and learning [Education, Vol. 115, No. 1, 1994]. Bagayoko and colleagues *introduced a problem-solving paradigm* (College Teaching, Winter 2000) that has been somewhat validated by “*Adding it Up: Helping Children Learn Mathematics*” where four (4) of the five strands of the paradigm are reinvented in this 2001 publication of the National Academy of Science. Bagayoko and colleagues were the first to utilize the *certainty of response index (CRI)* in the identification of misconceptions in science and mathematics while distinguishing these misconceptions from a lack of concept or of knowledge.

#### **A4. SUMMARY OF ADMINISTRATIVE, SPONSORED PROGRAM, AND INFRASTRUCTURE BUILDING EXPERIENCE AND RESULTS**

##### **ADMINISTRATION**

- **Dean**, the Dolores Margaret Richard Spikes Honors College, SUBR (2015-Present)
- **Statewide Director** (2003-present) of the Louis Stokes Louisiana Alliance for Minority Participation ([www.ls-lamp.org](http://www.ls-lamp.org)) which includes Dillard, GSU, LSU-BR, LUMCON, McNeese, Nunez, SUBR, SUNO, SUSLA, Tulane, ULL, UNO, and Xavier - with SUBR as the lead institution.
- **Chairman** (2009-July 2015) of the Department of Physics at SUBR.
- **Director, Master’s Degree Program** in Physics, Southern University and A&M College (1996-present): Was the principal author of the proposal for the establishment of the program and successfully defended it at hearings at the Louisiana Board of Regents. As noted above, personally directed the thesis research of five (5) MS students (avec colleagues).
- **Director, Office of Grants, Sponsored Research, and Faculty Development**, 1987-1989: Measurably contributed to a quantum leap in sponsored project and research performance at SUBR, including a fourfold increase in the number of NSF supported projects. Successfully managed, as *project director*, sponsored research and instructional grants and contracts over \$1,000,000 per year from 1993 to present while playing a pivotal role in others that included the NSF funded *Louis Stokes Louisiana alliance for Minority Participation* (LS-LAMP, 1995-present) and the *HBCU-UP/SMART* project at SUBR (1999-2003).
- **Associate Director of Louisiana Space Consortium (LaSPACE)**, from 1992 to 2005, and of the Louisiana Space Grant (2005-present). The latter was made possible by the success of the former, both were led by Professor John Wefel until 2014-15 when Professor Gregory Guzik became the director, following the retirement of Prof. Wefel.

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### **SPONSORED FUNDING** **Over \$53 Million for over 55 projects**

- **A summary of the grantsmanship performance** of Bagayoko is shown below. **A partial listing of the sponsored projects** [with funding agencies and amounts, project periods, objectives, principal investigators, and results] is available at <http://www.phys.subr.edu/PhysicsCurrent/faculty/bagayoko/>

**\$5,259,330** from 1984-85 to 1998 (Directed by Bagayoko) for the Timbuktu Academy, mostly from The Department of the Navy, Office of Naval Research (ONR).

**\$3,000,000** of competitive awards to Bagayoko as director (1998-00) from various sources;

**\$2,000,000** of competitive ONR grant to the Timbuktu Academy (1999-2004)

**\$29,950,000** of competitive Louis Stokes Louisiana Alliance for Minority Participation (LS-LAMP) In STEM awards, from the National Science Foundation (NSF) with Bagayoko as Co-principal Investigator (1996-2003) and Project Director & PI (2003-Present) for LS-LAMP statewide

\$7.2 Million of LS-LAMP (1996-2000), \$7.5 Million (2000-2005), \$7 Million (2006-210)

\$5,000,000 (2010-15), and \$3,250,000 (2015-2020).

**\$3,250,000** for *New Models in Teaching, Mentoring, and Learning (NTML)* and the *MS Program in Physics (1997-2002)*

**\$3,000,000** of NASA support for PIPELINES (2000 to 2003), directed by Bagayoko.

**\$400,000** of new NASA funding for PIPELINES (2005-07), with Bagayoko as the project director

**\$3,948,000** from the National Science Foundation for the Bridge to the Doctorate Program of LS-LAMP [D. Bagayoko, co-principal investigators (Co-PI), with Drs. S. S. Pang, Isiah Warner, and S. Watkins as co-PIs; 2005-06 to 2008-09].

**\$1,888,179** of NSF and Board of Regents' funding of SUBR, through LASIGMA, for the period of September 2010 to August 2015.

**\$500,000** of competitive funding from the US Department of Energy (DOE), National Nuclear Security Administration (NNSA).

**Extensive infrastructure enhancement** at SUBR has been made possible by some of these grants, including the establishment of *the first leg of the SUBR campus wide computer network*. Bagayoko was the principal author of the proposal and strategic plan for the establishment of *the Ph.D. degree program in Science and Mathematics Education (SMED)*.

### **PROGRAM DEVELOPMENT**

- *Principal author* of the proposal for the establishment of the MS program (1993-94). The program enrolled its first students in the fall of 1996.
- *Principal author* of the proposal and strategic plan for the establishment of the *Ph.D. degree program in Science/Mathematics Education* (1994-96); the program enrolled its first students in the spring of 1999.
- *Principal Author* of the 1988 Position Paper (adopted by the Faculty Senate) that led to the establishment of Ph.D. degree programs as a focus of the Higher Education Desegregation and actually led, with the work of many others, to the establishment of 4 Ph.D. programs at SUBR. *An understanding of the dynamics of higher education is apparent in this position paper whose Page 9 was at the core of SUBR's submission to the court.*

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## PARTICULARLY IMPORTANT INFRASTRUCTURE BUILDING EXAMPLES

- Directed the Enhancement of Academic Computing at SUBR, funded by the LEQSF program at \$250,000. **This project, in collaboration with Facility Planning, not only built the first legs of SUBR's fiber optics backbone network, but also arranged to have underground conduits through the campus for the expansion of the network.**
- In 1997, Directed New Model in Teaching, Mentoring and Learning that **established the Campus Network Management (CNM)**. This project shepherded SUBR network until the establishment (in 1999) of the Technology and Network Services Office.

## A5. SELECTED UNIVERSITY SERVICES AND ACCOMPLISHMENTS

(in reverse chronological order)

- Chairman of the University Retention Task Force (2016-2017)
- University Graduate Council (2012-2015)
- University Research Council (2012-2015)
- SU Laboratory School Expansion Committee (2015-2016)
- Served as the Parliamentarian of the SUBR Faculty Senate (2012 to August 9, 2015)
- Member, Strategic Planning Team of Southern University, 2009.
- **President, Faculty Senate**, SUBR (1996-2000);
- Served as Faculty Senate Vice President (2004-2006) and Parliamentarian (2006-2010).
- Served on the following committees at SUBR: Tenure and Promotion (1989-92); **Accreditation Steering Committee (1998-99) for the 2000 reaffirmation**; Chair or member of PhD Program Development Committees, Science/Mathematics Education and Materials Science and Engineering, respectively; and numerous other councils, committees, and task forces.
- **University System representative on two advisory committees of the Louisiana Board of Regents:** Louisiana Education Quality Support Fund (LEQSF, **1987-2015**) Planning Committee and the Experimental Program to Stimulate Competitive Research (EPSCoR, 1987-present) Committee. Chaired LEQSF Planning Committee from 2002 to 2004.
- Member, National Science and Engineering Advisory Committee of the National Association for Equal Opportunity (NAFEO) in Higher Education (1990-2010).
- **Manuscript referee** for Physical Review B and Letters (early 1990-Present), the Journal of Crystal Growth (2007-Present), several journals of Elsevier, Materials Research Express, and for the Journal of Negro Education (JNE).
- *An average of fifteen (7-12) presentations to K-12 students, teachers, and parents per year (2001-present)* at the request of the Louisiana Board of Regents in the Speaking of Science Program.

## A5. CONSULTANT ASSIGNMENTS

Consultant for the National Science Foundation (NSF) for a panel review of proposal (January 7-10, 2018).

Served as Co-Chair of the Education Community Input Transition Team of Mayor of Baton Rouge and President of East Baton Rouge Parish, the Honorable Sharon Weston Broome. Final report submitted, in printed and bound copies and electronically, on January 31, 2017.

Proposal Review Consultant for the National Science Foundation (NSF), Southern University's Board of Regents Support Fund program, and others (1996-present)

Manuscript referee (unpaid work) for The Physical Review, the Journal of Physics and Chemistry of Solid, the Journal of Negro Education, Computational Condensed Matter, and other scientific journals (1990 to present)

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**Bagayoko served as the Chair of the Commission on Higher Education and Research for the preparation of the National Forum on Education in Mali, 2008.** The resulting Annex prepared by a Sub Commission that included Dr. Bagayoko is a Strategic Plan for higher education and research in Mali.

To participate in the preparation of the GLOBE learning Expedition planning and to deliver a keynote address at the meeting of GLOBE Africa Consortium, at the invitation of GLOBE ([www.globe.gov](http://www.globe.gov)), in Riversdal, South Africa (April, 2007).

To conduct research and advise a doctoral student, at the invitation of the TOKTEN program ([www.toktenmali.org](http://www.toktenmali.org)) [December 2005, July 2006, March 2007, and July 2008), at the University of Bamako, Bamako, Mali

To develop scientific research programs and projects for the continent of Africa, at the invitation of *the International Council of Science* ([www.ICSU.org](http://www.ICSU.org)), September 2006.

To develop and to implement, *with East Baton Rouge Parish School System (EBRPSS)*, the Reconstitution Plan of Prescott Middle School (2004-2007) and of Glen Oaks MS (2006-2008)

To advise the *Malian Government* (September 2003) and the *African Union* (in October 2004, [www.au.org](http://www.au.org)) on Science and Technology capacity (i.e., Education, Research, and Applications) as a key development tool.

To Deliver Science Education Reform Workshops for Teachers, Demonstrations and Motivational Speeches to K-12<sup>th</sup> Grade Students across Louisiana (1999-Present), at the request of the *Louisiana Board of Regents* [Speaking of Science Program (SoS)]

To conduct workshops on reform-guided standard-based teaching and the associated standard-based learning as verified by objective assessments. Several school districts in the State of Louisiana, including those of St. Martin, East Baton Rouge, and St. Helena Parishes have utilized Bagayoko's services (1990 –Present).

To conduct workshops and parental involvement meetings for *the Louisiana Department of Education* (February and June 2001).

To conduct instructional workshop and to evaluate the instructional practices and the related standardized test results of students for the J. K. Haynes Elementary Charter School (1998 to Present)

To Evaluate the TOTKEN Project of the University of Mali, Mali, West Africa, for the United *National Educational, Scientific, and Cultural Organization* (UNESCO) and the United Nations Development Program (Fall 2000).

To evaluate student mentoring/research participation programs across the US for the NAitonal Aeronautics and Space Administration (*NASA*) (1992).

To review programs, proposals, or graduate fellowship applications for *the National Science Foundation (NSF)*, *the US Department of Education (US-ED)*, *NASA*, *the Louisiana department of Education (La DOE)*, and *others* (1990 – present).

## **B1. PUBLICATIONS (over 190 publications) – summarized above and listed in the 90+ page CV**

**As summarized above, over 130 publications are mostly in Physics and over 60 are in Teaching, Mentoring, and Learning (TML). Several of the publications (over 100) are listed at the following web site**, with complete referencing information. A few singularly important articles are below.

<http://www.phys.subr.edu/PhysicsCurrent/faculty/bagayoko/>

### **Selected Physics Publications**

*“Accurate Electronic, Transport, and Related Properties of Wurtzite Beryllium Oxide (w-BeO),” Cheick Omar Bamba, Yuriy Malozovsky, L. Franklin, and D. Bagayoko, Journal of Modern Physics, 2017, 8. 1938-1949.*

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“*Understanding the Relativistic Generalization of Density Functional Theory (DFT) and Completing in Practice,*” D. Bagayoko. Accepted for publication in the Journal of Modern Physics (JMP). 2016

“*Calculated Electronic, Transport, and Bulk Properties of zinc-blende Zinc Sulphide (zb-ZnS),*” B. Khamala, L. Franklin, Y. Malozovsky, A. Stewart, H. Saleem, and D. Bagayoko. Journal of Computational Condensed Matter January 5, 2016, (Elsevier) <http://dx.doi.org/10.1016/j.cocom2015.12.001>.

“*Ab-initio computation of electronic and transport properties of wurtzite aluminum nitride (w-AlN),*” I. H. Nwigboji, J. I. Ejembi, Y. Malozovsky, B. Khamala, L. Franklin, G. L. Zhao, C. E. Ekuma, and D. Bagayoko. Journal of Materials Chemistry and Physics, 157, 80-86 (2015) <http://www.sciencedirect.com/science/article/pii/S0254058415001716>  
<http://dx.doi.org/10.1016/j.matchemphys.2015.03.019>

“*Understanding Density Functional Theory (DFT) and Completing it in Practice,*” D. Bagayoko, AIP Advances 4, 127104 (2014). DOI:10.1063/1.4903408 [ <http://dx.doi.org/10.1063/1.4903408> ]

“*Comprendre la théorie de la fonctionnelle de la densité (TFD ou DFT) et la compléter en pratique,*” D. Bagayoko. 2014 Malian Symposium of Applied Sciences (MSAS-2014), International Conference Center of Bamako (ICCB or CICB in French), Bamako, Mali, August 2014. DOI: 10.13140/2.1.3722.6566

“*Ab-initio calculations of electronic, transport, and structural properties of boron phosphide,*” J. I. Ejembi, I. H. Nwigboji, L. Franklin, Y. Malozovsky, G. L. Zhao, and D. Bagayoko, J. Appl. Phys. 116, 103711 (2014).

“*Ab-initio Calculations of Electronic Properties of InP and GaP,*” Y. Malozovsky, L. Franklin, E. C. Ekuma\*, G. L. Zhao, and Diola Bagayoko. Inter. J. Mod. Phys. B, Vol. 27, No. 15, 1362013 (2013).

“*Re-examining the electronic structure of germanium: A first principle study,*” C. E. Ekuma, M. Jarrell, J. Moreno, G. L. Zhao, and D. Bagayoko, Phys. Lett. A, Vol. 377, 34-36, 2172-2176, 1 November 2013 - <http://authors.elsevier.com/sd/article/S0375960113005318>.

“*Density functional theory description of electronic properties of wurtzite zinc oxide (w-ZnO),*” L. Franklin, G. L. Zhao, C. E. Ekuma, and D. Bagayoko. Journal of Physics and Chemistry of Solids 74,729-736 (2013). (<http://dx.doi.org/10.1016/j.jpcs.2013.01.013i> )

### **Selected Publication on Teaching, Mentoring, and Learning (TML)**

“*Undergraduate Research at the Timbuktu Academy and LS-LAMP*” at Southern University and A&M College in Baton Rouge (SUBR), by [Diola Bagayoko](#) , Ella L. Kelley , [LaShounda Franklin](#) (2015), in Jeton McClinton , Mark A. Melton, Caesar R. Jackson, Kimarie Engerman (ed.) *Infusing Undergraduate Research into Historically Black Colleges and Universities Curricula (Diversity in Higher Education, Volume 17)* Emerald Group Publishing Limited, pp.87 – 114.

«*The Law of Human Performance and Broadening Participation in STEM,*” D. Bagayoko, the Gazette of the American Physical Society’s CSWP and COM, Vol. 32, No. 2, Pages 1, 3, & 7 (2013).

“*The Philosophical Foundations of Systemic Mentoring at the Timbuktu Academy.*” D. Bagayoko. Science Next Wave, American Association for the Advancement of Science (AAAS). An online publication available at <http://nextwave.sciencemag.org/>, 2002.

“*The Dynamics of Student Retention: A Review and a Prescription*” D. Bagayoko and Ella L. Kelley, Education Vol. 115, No.1, 31-39 (Fall, 1994).



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*"Cognitive Condensation for Mastery Teaching and Learning."* D. Bagayoko and E. L. Kelley, Education, Vol. 115, NO. 1, 19-25 (Fall 1994).

*"A Paradigm of Education: the Model of the Timbuktu Academy."* W. E. Moore and D. Bagayoko, Education, Vol. 115, NO. 1, 11-18 (Fall, 1994).

**B2. PRESENTATIONS:** *Over 550 presentations*, including over **100 international ones**. Over 300 are listed at the web (<http://www.phys.subr.edu/physics/faculty/bagayoko/index.html>).

Illustrative Examples of National and International Contributions Follow.

March 7, 2017, *"March Predictive Calculations of Electronic and Related Properties of Materials,"* a technical presentation to scientists at Lawrence Livermore National Laboratory (LLNL) and from seven Historically Black Colleges and Universities (HBCU's).

February 10, 2016, A Black History Month Presentation, Greater Mount Carmel, Baton Rouge LA. Invited Presentation: *"An Education Heritage of Blacks: The Universities of Timbuktu,"* Diola Bagayoko. Audience: 20 children and 40 adults. [Invited & Local]

February 2, 2016, Young Engineers Society, SEED Center, Lake Charles, LA. Invited Presentation: *"Scientific Method for All,"* Diola Bagayoko. Audience: 20 5<sup>th</sup> and 6<sup>th</sup> grade students and 1 teacher. [Invited & Local]

October 9-11, 2015. 2015 National Mentoring Community & Bridge Program Conference-American Physics Society (APS). Florida International University, Miami, Florida. *"The Systemic Mentoring Style and Model of the Timbuktu Academy,"* Audience: 100 faculty members and administration and 25 grad students [Invited & National]

September 30, 2015. 2015 Meeting of the National Space Grant, Tuscan, Arizona. Invited Presentation: *"The Systemic Mentoring Model of the Timbuktu Academy,"* D. Bagayoko. Audience: 200 faculty members [Invited & National]

August 6, 2014. Malian Symposium of Applied Sciences (MSAS), Reseaux International Conference Center of Bamako. Bamako, Mali. Invited Presentation: *"Comprendre la Théorie de la Fonctionnelle de la Densité et la Compléter dans la Pratique,"* Diola Bagayoko. Audience: 60 researchers from around the world, faculty members, and graduate students

December 11, 2007, Dar es Salaam, Tanzania. Invited, plenary presentation at the 4th International Conference of the African Materials Research Conference on "A mathematical solution to the band gap catastrophe: Predictive calculations of properties of semiconductors and of nuclei."

April 2007, Riversdal, South Africa; Meeting of GLOBE Africa Consortium: Keynote address: Inventing a Better Future for Africa with GLOBE.

January 2006, Faculty of Science, Department of Physics, University of Bamako: "Physics, its Importance and Wonders."

November 3-5, 1999. Department of Defense (DOD) Science, Mathematics, and Engineering (SEM) Education Leaders Conference; Arlington, VA, Invited Presentation on *"Undergraduate Success Stories."* Over one hundred (100) DoD attendees (from all branches) and other leaders.

May 8, 1999. NAACP's Daisy Bates Educational Symposium, New Orleans, LA; Invited Presentation on *"Minorities in Science and Engineering."* Over 100 attendees with over 50 participated in discussions.

July 29-30, 1998. US Workforce Development Workshop organized by the National Science Foundation and the White House Office of Science and Technology (OST). Invited Presentation on Perspectives of US Presidential Award Winners. Over one hundred (100) government, educational, and private leaders.

In complex processes, good faith and good will are generally not enough; pertinent knowledge, know-how, and sustained efforts are necessary more often than not. *The full vita of D. Bagayoko is available upon request, with all the 90+ pages listing all grants, publications, and presentations.*

April 1997 and 1998; February 2000 and March 2001: *Co-Organizer and Session Chair: Undergraduate High Tech Expo* of the National Organization for Equal Opportunity (NAFEO) in Higher Education, Washington D.C.

### **B3. PARTNERSHIPS/COLLABORATIONS AND RELATED POTENTIALS**

Extensive collaborations and partnerships with federal, industrial, and university laboratories around the country--where Timbuktu Academy scholars conduct summer research. Forty eight (48) Academy scholars were placed around the country in the summer of 1999, over 50 in 2001. Collaborations: with LSU (LaSPACE, Joint Faculty, Condensed Matter Research), Iowa State University (ISU), Michigan Technological University (MTU), Smithsonian Institution, etc.

### **B4. PROFESSIONAL ORGANIZATIONS** (*For, to join our peers and to partake in the research, educational, and service discourse or not to do so is the question*)

American Association for the Advancement of Science (AAAS)  
The American Physical Society (APS), U.S.A., (1979-Present)  
National Science Teachers Association (1991-Present)  
The New York Academy of Science (1991-Present)  
The National Society of Black Physicists (NSBP), (1982-Present)  
Member of over five Divisions and Forums of APS.  
The Louisiana Academy of Science (LAS) (1990-Present)  
Sigma Pi Sigma Physics Honor Society (SPS), (1986-Present)  
Phi Delta Kappa (PDK) Education Honor Society (1988-Present)

### **B5. AWARDS AND HONORS** (Representatives out of the 50 major ones)

- **STEM Innovation Award (2017), from Be All You Are (BEYA) national organization**
- SU Millionaire Club Award for Grantsmanship, 2015)
- Louisiana Role Model Award (2012)
- Dr. Bagayoko is the recipient of **the 2009 Lifetime Mentor Award of the American Association for the Advancement of Science (AAAS)**
- **The National Thurgood Marshall College Fund Distinguished Faculty Award** to Dr. Diola Bagayoko, Director, the Timbuktu Academy, March 15, 2009.
- **National Benjamin Banneker Legacy Award** (To Bagayoko and the Timbuktu Academy), 2007, Award presented by Dr. Bill Cosby in the J W Marriott in Washington, D.C., on November 7, 2007.
- Southern University Grantsmanship Awards: Most Awarded Proposals (2001-02 & 1998-99)
- **Founder and director of the Timbuktu Academy, the Academy was a recipient of the 2002 US Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring**
- *Award of Volunteers in Public Schools (and Golden Apple Nominee, 2002)*
- *Distinguished Service Award, Forest Heights Elementary (2002)*
- Southern University Grantsmanship Award: Millionaire Club (Each year, from 2001-02 to 1998-99)
- *Southern University System Distinguished Professor (1999-present).*
- ***Ciwara D'Exception***, national award in Mali, West Africa, for exceptional accomplishments (1997)
- **One of the first group of 10 recipients of the U.S. Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (1996; Washington, D.C.), for individuals**
- *Chancellor's Fellow, distinguished academic appointment at SUBR (1994).*
- SU System's Presidential Faculty Excellence Award (May 1993)
- **Louisiana Governor's Award** for Excellence in Educational Reform (1993)

**Note:** *A much expanded version of this CV is available upon request; it contains a complete listing of all the publications, presentations, and sponsored projects (i.e., grant, contracts, and cooperative agreements). See several of these items at <http://www.phys.subr.edu/PhysicsCurrent/faculty/bagayoko/> .*