

# A Brief Look at the History and Future of the School of Mathematics, Physics and Technology

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## ABSTRACT

This paper provides a brief history and overview of the development of the School of Mathematics, Physics and Technology at the College of The Bahamas from the College's inception in 1974 to 2014. It charts the evolution of the School out of two major departments within the College, highlighting the development of the School's academic courses, programs and research facilities, in the context of the College's overall strategic plan toward attaining university status. The paper also chronicles the present and past chairpersons and discusses briefly the significance of Mathematics, Physics and Technology in the context of Science, Technology, Engineering and Mathematics education within the grander framework of the role of COB in providing widespread tertiary education in The Bahamas. The paper celebrates and analyzes the progress of the School in its various earlier incarnations, and its programs over the past 40 years, and provides some thoughts about the directions in which it should go in helping to fulfill the College's mandate to transition to a university in 2015.

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## INTRODUCTION

The School of Mathematics, Physics and Technology (SMPT) has an interesting and motley history. The current composition of the School is the most recent in a series of metamorphoses throughout the 40-year existence of the College of the Bahamas (COB). Initially, the relevant sectors of COB were known as Divisions under the overall charge of a Provost (of the C.R. Walker/Soldier Road Campus) and Dean of Academic Affairs (College of The Bahamas, 1985). Among these were the cocooned Division of Natural Sciences (NASC) and the

Divisions of Applied Science (AppSc) and Technology (TECH), out of which essentially the SMPT eventually emerged. NASC comprised the disciplines of Agriculture, Biology, Chemistry, Mathematics, Physics and Nursing, whereas TECH and AppSc consisted of Architectural Drafting, Construction Engineering (or Building Construction), Electrical Power/Electronics and Mechanical Technologies. The AppSc and TECH Divisions were rather short-lived as separate entities as they were merged into the Division of Technology in only the second year of the College's existence. Eventually, the Soldier

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Road Campus and all of its subordinate departments were transferred over to the main COB Campus in Oakes Field in 1983 when the new T-Block technology building was completed.

The nomenclature, “Division,” and charge of the Dean, continued for more than half of the College’s existence, during the challenging early years. With a new-found impetus for change and the accelerated pace towards university status, COB was reorganized along traditional university lines, first into Faculties and, later, also Schools. Thus, in 1997, two faculties were created, namely one of Arts and Sciences and the other of Professional Studies, with the latter having oversight of the NASC and TECH Divisions (College of The Bahamas, 1997). Then, in 2000, the Divisions of NASC and TECH became known as the School of Natural Sciences and Environmental Studies and the School of Technology, respectively, under the umbrella of a newly formed Faculty of Pure and Applied Sciences (College of The Bahamas, 2000 & 2014a). Later on, in 2005, in an effort to conserve

resources, the two Schools were combined as the School of Sciences and Technology, remaining within the same faculty. Shortly thereafter, also in 2005, and still in the spirit of progress, the terminology or designation of faculty members was changed from the “lecturer” system to the more traditional “professor” system, which coincided with the introduction of a new career and salary structure for faculty, designed to increase faculty productivity and output.

The marriage between the NASC and TECH was relatively short-lived, as in 2009 the disciplines were once again reshuffled. The result was the structure that exists at present, with the disciplines of Mathematics, Physics and Technology being placed under the purview of the SMPT; and those of Chemistry and the Environmental and Life Sciences under that of the School currently going by that name (SCELS). A chronology of the chairpersons of the Divisions/Schools relevant to the above history of SMPT is given in *Table 1*.

Table 1: Chairpersons of the Divisions and Schools from 1974 to 2014

<b>Division of Natural Sciences</b>	<b>Division of Applied Science</b>	<b>Division of Technology</b>
Sam Rendle, Mathematics	Brian Dwyer, HNC, Mechanical/Production Engineering, Dip. Ed. (1974-75)	Alvan K. Rolle, B. Arch., Architecture (1974-75)
	<b>Division of Technology (AppSc and TECH Combined)</b>	
Judith Blair, M.S., Chemistry	Alvan K. Rolle, B. Arch., Architecture	
Cecile Knowles, M.S., Education, R.N.	Ken Warhurst, HND, Mechanical Engineering	
Brenda Cleare, Ed. D., Mathematics	Rodney Braynen, B. Arch., Architecture	
Cephas Ward, M. Ed., Mathematics	Dr. Donald Camp	
Lionel Johnson, B.S., Biology, Dip. Ed. (1996-2000)	Amos Ferguson, M. Arch., Architecture	
	Hamlet Hope, HTD, Technology, Diploma in Public Admin.	
	Llewelyn Curling, Ph.D., Mechanical Engineering (1994-1998)	
	A. Philip Armbrister, M.S., Electrical Engineering Technology, Dip. Ed. (1998-2000)	
<b>School of Natural Sciences &amp; Environmental Studies</b>	<b>School of Technology</b>	
Lionel Johnson, B.S., M.S., Biology, Dip. Ed. (2000-04)	Gurth Ford II, M.S., Electrical Engineering (2000-2001)	
	Freeman Kelly, M.S., Electrical Engineering, T.C. (2001-02)	
	A. Philip Armbrister, M.S., Electrical Engineering Technology, Dip. Ed. (2001-04)	
<b>School of Sciences &amp; Technology (NASC, Environmental Studies and TECH Combined)</b>		
Lionel Johnson, B.S., M.S., Biology, Dip. Ed. (2005)		
Bridget Rolle-Hogg, M.S., Chemistry (2005-08)		
Carlton Watson, Ph.D., Physics (2008-09)		
<b>School of Chemistry, Environmental &amp; Life Sciences</b>	<b>School of Mathematics, Physics &amp; Technology</b>	
Lionel Johnson, B.S., M.S., Biology, Dip. Ed. (2009-12)	Carlton Watson, Ph.D., Physics (2009-2012)	
Dion Hepburn, Ph.D., Chemistry (2012-Present)	Maria Woodside-Oriakhi, Ph.D., Mathematics (2012-Present)	

## **THE NATURAL SCIENCES**

From the beginning, the Division of NASC offered mainly Associate of Arts (AA) degrees in Biology, Chemistry, Mathematics and Physics, as well as GCE A-Levels in these subjects (College of The Bahamas, 1985). The Division was always thinking about and working towards conducting research, hence, it expanded its networks for this purpose.

In 1996, the Division began expanding its responsibilities when the College took control of the Gerace Research Centre in Grahams Harbour, San Salvador. This center offers facilities for students, professors, and researchers from around the world who wish to study in a tropical environment. The research disciplines include Archaeology, Biology, Geology, and Marine Science (College of The Bahamas, 2009a).

In 2004, the Division further expanded when it opened the Poultry Research Unit on Gladstone Road. This unit was established on a five-acre tract of land provided by the Ministry of Agriculture. The facilities included a silo, housing capacity for 24,500 birds and other ancillary buildings for agricultural and biological research and experimentation needs. Research at the Poultry Research Unit was focused primarily on sustainable agricultural practices (College of the Bahamas, 2009a). The Poultry Research Unit is presently nonoperational.

In 2005, the Marine and Environmental Studies Institute was established. This Institute served as a multidisciplinary organization committed to building national capacity in research, and long-term information and monitoring management in the areas of science, technology and community health as these pertain to the sustainable use and management of marine

and other natural resources (College of the Bahamas, 2009a). Presently, the Marine and Environmental Studies Institute, like the Poultry Research Unit, is nonoperational.

As the Division's research capacity expanded, so did its course offerings with the introduction of the Bachelor of Science in Biology with a minor in Chemistry, the Bachelor of Science in Mathematics in 2005, the Associate of Science in Agriculture and the Associate of Science in Geography.

## **TECHNOLOGY**

From its inception, the Division of TECH offered diplomas and Associate of Arts degrees in various technical disciplines, which included Architectural Drafting, Construction Engineering and Electrical Power/Electronics Technologies and various Mechanical Technologies (College of The Bahamas, 1985). The majority of the programs in these disciplines were at or just beyond the technical training level. The Division also offered Certificates in Single and Three Phase Electrical Installation, and, along with these, administered Journeyman and Master Plumbing licence courses. Today, however, these professional development certification courses are administered entirely by the Center for Continuing Education and Extension Services at COB (College of The Bahamas, 2014b, 2014c & 2014d).

In the early 1990s, or just before, general course and program upgrading began to accelerate within the Division. A massive upgrading exercise was eventually embarked upon in 1992. As a result, the majority of the divisional programs that previously existed were upgraded from the technical training level to the professional level, and some technical programs, e.g., diplomas in metal fabrication, refrigeration and air-conditioning, and plant maintenance, were

either gradually phased out or removed from college offerings. Accordingly, the Division then offered, beginning in 1993, revised and significantly upgraded versions of the following: the AA in Architecture, and the AA in Civil, Electrical Power, Electronics and Mechanical Engineering Technologies, while yet retaining some technical degree programs, then called Associate of Applied Science (AAS), in the areas of Architectural, Automotive, Electrical Installation and Power Systems, and Electronics Technologies (College of The Bahamas, 1994 & 1996). Some ten years later the AAS programs too, though remaining on the books, had become further deemphasized as student enrollment in these areas fell, leaving a focus mainly on the more academic, university caliber AA degrees in Architecture, Engineering and the engineering technologies (College of The Bahamas, 2014c).

Around the same time as the aforementioned massive upgrading, a new AA degree program in Pre-Engineering was developed. This program, which permitted graduating students to transfer directly into bachelor degree programs in engineering at universities abroad, came on stream in 1992 (College of The Bahamas, 1996).

In 2005, the degree terminology once again morphed, and the respective AA degree programs in Technology (i.e., all except the AA in Civil Engineering Technology and Pre-Engineering) became Associate of Science (AS) degrees. In 2005, the Bachelor of Science in Engineering Technology in Electrical Engineering Technology came on stream.

Civil Engineering/Engineering Technology, being one of the four or five fundamental branches of the engineering spectrum, and an essential technological discipline for a modern developing society (Curling,

Hepburn, Thompson & Pratt, 2005), constitutes an indispensable subset of academic technology. Of particular importance within this discipline, for developing societies, are the areas of highway design/construction/maintenance; structures/construction; water resources; foundation/geotechnical and drainage engineering and technology; traffic flow engineering; environmental engineering; waste management; elementary surveying/site planning; and cost estimating/construction management. In an unfortunate move, however, the AA degree program in Civil Engineering Technology was dropped from the books at COB in 2004, in an apparent effort to save cost; however, it was later resurrected and returned to College offerings as the AS in Civil Engineering Technology in 2009 (College of The Bahamas, 2006, 2009b, 2014b & 2014c). During that same period, a similar fate and recovery also befell the AA in Pre-Engineering, perhaps for the same ostensible cost-cutting reasons. This program also ceased to be offered in 2004; it was later replaced by the AS in Engineering Physics (2006), and finally, in 2009, reinstated fully as the AS in Engineering (College of The Bahamas, 2006, 2009b, 2014b & 2014c).

## **MATHEMATICS AND PHYSICS**

The story of mathematics and physics is as interesting as that of technology. The departments of Mathematics and Physics have mainly served the College of The Bahamas as service departments. Every student has to take Mathematics courses to fulfill the numeracy requirement while every science student takes at least General Physics as a Natural Science requirement.

The degree offerings of the Mathematics Department have evolved from an associate degree program to that of a bachelor of science. In 2005, the Department began the

Bachelor degree program. This exposed mathematics students to areas such as abstract algebra, combinatorics and advanced differential equations.

Not long after, the Physics Department followed suit, developing the Bachelor of Physics with Mathematics. They further built on this to develop the Associate of Science in Engineering Physics in 2006.

### **THE IMPORTANCE OF MATHEMATICS, PHYSICS AND TECHNOLOGY**

The subjects of mathematics, physics and technology are extremely significant for modern development, generally, and for a small scientifically and socioeconomically developing country such as The Bahamas, particularly. It is, therefore, utterly important that the support given thus far for these subject areas at COB be continued, as this institution prepares to transition into a university, with special relevance for the continued growth and development of the SMPT, and the advancement of tangible disciplines like those of the Natural Sciences, Engineering, Architecture and Technology.

### **COLLEGE PREP / PRE-TECH**

From the outset, the College provided opportunities for student upgrading through its Continuing Education and Extension Services Upgrading, College Preparatory and Pre-Technology programs. These were provided for students who did not obtain the necessary qualifications for direct entry into college level diploma and associate degree programs. The first of these, the CEES Upgrading program, supported students who were below even the pre-college College Preparatory and Pre-Technology standard. The second, i.e., the slightly higher pre-college level College Preparatory program (College Prep for short) directly supported the non-technology college level programs, while, at the same pre-college standard, the third and final Pre-Technology program

(Pre-Tech for short) catered specifically to those college level programs in the Division of Technology. Over time, the Pre-Tech program underwent a number of reconceptualizations, particularly in the 1990s, to increase emphasis on and improve student preparation for the higher academics they would face later on in their studies.

In 1993-1994, in an ill-fated attempt to conserve resources, the College Prep and Pre-Tech programs were outsourced to the Bahamas Baptist Community College (College of The Bahamas, 1996). This move was later determined to be premature, and, therefore, these programs were returned to the College by the fall of 1996 (College of The Bahamas 1996). Some years later, in a more conservative move, the administration and control of College Prep was transferred to CEES. Pre-Tech, however, remains under the oversight of SMPT (College of The Bahamas, 2014b, 2014c & 2014d). The individual courses in both programs, while complementing the specific pre-college level Pre-Tech and College Prep program requirements, and supporting general student upgrading, also continue to serve as individual deficiency improvement courses for college level programs throughout the College.

### **CONCLUSION**

This paper has provided a brief and consolidated history and possible future of the School of Mathematics, Physics and Technology at the College of The Bahamas. Over the 40 year life of the College, and the interesting and varietal 41 years of an independent majority governed Bahamas, COB has been guided on a long and arduous path to university status. In this process, the academic disciplines that fall under the Physical and Life Sciences, Engineering, Architecture and Technology have come a long way. There is, nevertheless, a lot more progress and development to be made, and a

long way to go, in the overall scheme of knowledge acquisition, advancement, technological progress, national development, and the milestone transition of the College of The Bahamas to the new University of The Bahamas. Hats off to the founders of this great institution who, as the historical account shows, had to brave new, theretofore uncharted waters in this country to initiate, against formidable odds, this important and absolutely necessary chapter in the tertiary education of the birthing nation.

A historical analysis, such as this present paper, will have import in taking stock of where we are, how we got here, and where we need to go; it will be instrumental in the creation of a road map for the future and, in the opinion of the authors, the identification of future positive paths upon which to travel, as well as the wrong turns and pitfalls of the past that should be avoided in the future. In our opinion, the specific and immediate goals for SMPT should now include the continued

advancement of faculty, towards further increasing, or maximizing, the percentage of those who have attained the highest degrees in their respective fields, and, simultaneously, the development of more Bachelor degree programs, and eventually graduate degree programs and expanded research facilities, in the major disciplines of Mathematics, Physics, Engineering Technology, Engineering and Architecture, as well as their many relevant sub-disciplines. As the SMPT continues to make its unique departmental contributions towards helping to fulfill the College's longstanding mandate to transition to a university, this time by the year 2015, the College will thereby better serve the communities of The Bahamas, as well as the regional and global academic arena, by not only continuing the tradition of providing good, useful and necessary tertiary education, as through teaching, but also by making greater contributions to the expansion of scientific knowledge through research.

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