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# Communications of the Association for Information Systems

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## Stretching from Punch Card/Programming to Business Data Processing to Business Information Systems

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### Abstract:

The world's oldest undergraduate degree program in data processing and information systems at Mississippi State University turned fifty years old in 2013. In this paper, we review the pioneering activities of the program's founder, Charles Moore, and provide insights into his foresight about the potential importance of information systems to business organizations. We explain how the program's founding marked a shift in the epistemological view of information systems education in the mid-1960s. We show the course offerings of business data processing and information systems and the timeline at MSU over the past five decades. We also share how his efforts are instilled in the continuing development of the business information systems program at Mississippi State University to this day.

**Keywords:** IS History, Data Processing, Information Systems, IS Curriculum, Programming, IS Career.

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## I. INTRODUCTION

There are several classic and significant historical information systems texts from the late 1960s and in early 1970s (Ackoff, 1967; Aron, 1969; Davis & Olson, 1974; Drucker, 1966), of which we specifically single out Davis and Olson's classic MIS textbook. In this book, they point out that "computers have become an essential part of organizational information processing because of the power of the technology and the volume of data to be processed. The application of computers to information processing began in 1954 when one of the first computers were programmed to process payroll" (Davis & Olson, 1974, p. 4). As Davis and Olson mention, the application of computers to information processing began in the mid-1950s.

As we can see in the undergraduate business information systems course offerings and timeline (Figure 1), the business information system (BIS) program and its academic curriculum at Mississippi State University (MSU) began in the early 1960s. Though originally named "business statistics and data processing", it is recognized as the first undergraduate information systems program in an accredited business college in the world. The BIS program at Mississippi State University is ultimately the product of one man's understanding of the potential importance of computing to business organizations: Dr. Charles Moore. Moore is credited as being the driving force behind the program's founding and development over the subsequent few decades.

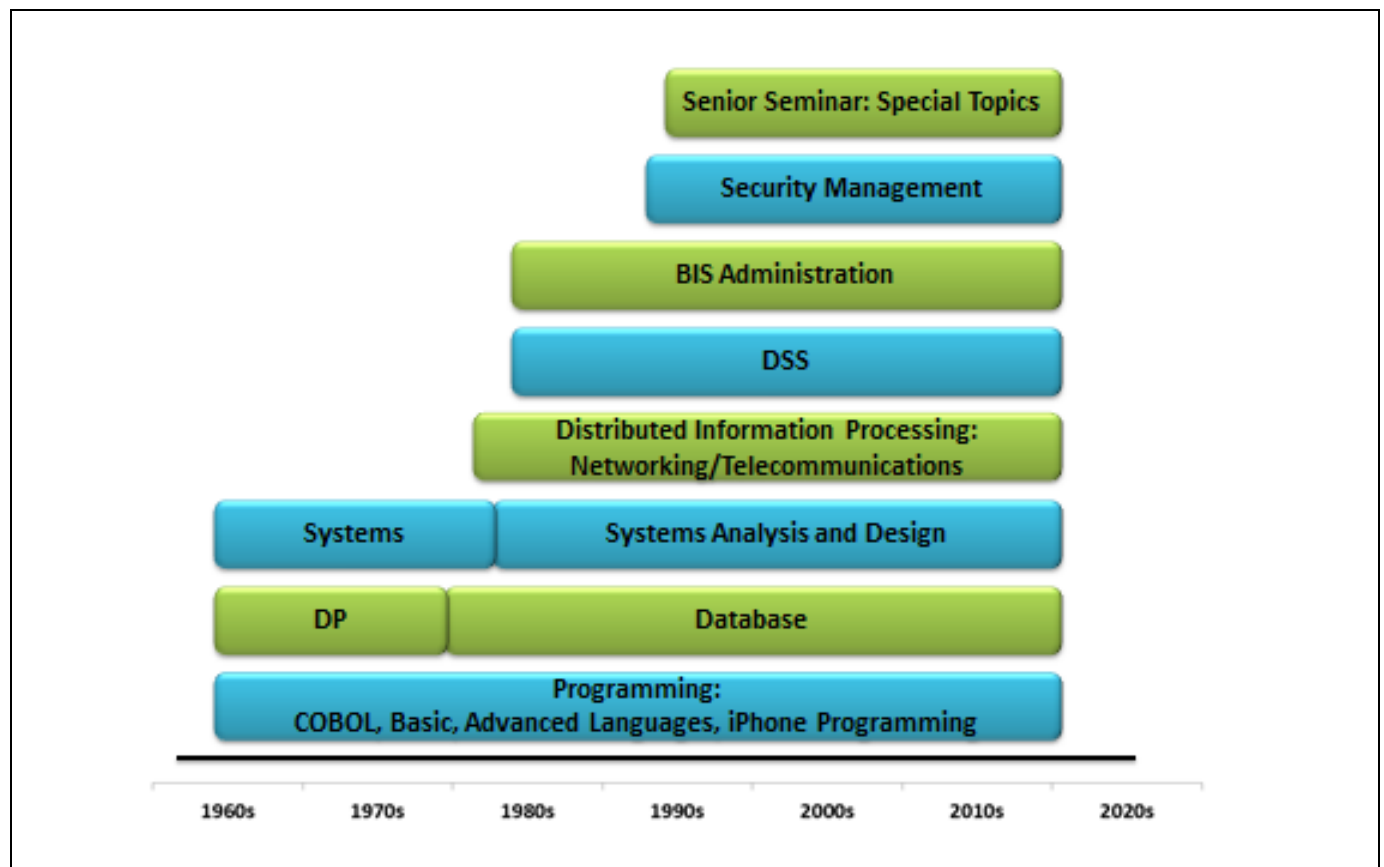


Figure 1. MSU Undergraduate Business Information Systems Course Offerings and Timeline

In this paper, we further acknowledge the pioneering role that Charles Moore had in developing the first undergraduate program in information systems, and highlight the philosophy that guided Moore's thinking as the program changed over the following decades. One could argue that Moore's curriculum demonstrates an epistemological advance from the 1950s view of information systems as being largely technical to a more current view of IS as being a social system (Hirschheim, 1985). Indeed, Moore's teaching and military experiences helped him develop the perspective that information systems could be more than just report-generating devices, and that

students could be more than future programmers and operators. His efforts in the early days of IS inspired other universities, both nationally and internationally, to invest in academic programs and computing resources in the nascent field.

This paper consists of four sections. In Section 2, we discuss Charles Moore's pre-MSU career. In Section 3, we describe the founding of the BIS program at Mississippi State University. Finally, in Section 4, we discuss Dr. Moore's legacy.

## II. CHARLES MOORE'S EARLY CAREER

Moore was born and raised in Marion, Alabama. He graduated from Perry County High School in 1934, and later enrolled and graduated from Auburn University in 1940. Moore's computing experience grew during World War II. Through serving in the U.S. Navy, he collaborated on an early computing project that converted manual ordnance records to an IBM punch card system for the U.S. Army. Punch card systems, which primarily produced output and not much else, were commonly used to generate something Moore observed as "listing reports". These simple reports would later inspire Moore as an academic. During the war, Moore saw combat in Saipan, Tinian, Iwo Jima, and Okinawa as the captain of an amphibious landing ship tank. After completing his service in 1946, Moore was able to use the G.I. Bill to enroll in the MBA program at the University of Alabama.

As a graduate assistant, Moore taught a mathematics of finance course in University of Alabama's Department of Business Statistics. Following graduation, he earned a PhD in business statistics from the University of Michigan in 1948, and returned to University of Alabama in Tuscaloosa in 1956 as a faculty member in business statistics. Moore summed up the advent of business computing at the time:

*The fact that the size and complexity of the operations of modern business corporations makes it impossible for management to depend on personal observations for the information needed for making intelligent decisions.... It is not enough to assemble large masses of information and get it summarized in balance sheets, income statements, cost schedules, sales or market reports, and statistical tables. The data need to be analyzed and interpreted. Points of strength and of weakness must be located and brought to the attention of management. Trends must be detected. The consequences of possible lines of action must be approximated. All of this involves a mass of detailed work that is almost staggering in its volume and complexity.... In view of these conditions, the interest that business has shown in improved methods of data processing can easily be understood. (Moore, Humble, & Chapman, 1956, pp. 25-26)*

Based on the predicted demand for not only skilled programmers but also technology professionals who could understand business problems, Moore envisioned a university teaching program that could prepare students for careers in business computing:

*Three general types of [teaching] programs with specific aims can be expected to develop. One is to train students in the technology of the computers—how to design and operate the machines. A second type of program may develop to give students sufficient training in fundamentals to enable them to become programmers...A third type of program might well be aimed at preparing the student to make effective use of the machines in the analysis of [business] problems. Such a program would be largely concerned with giving the student mastery of analytical procedures that are applicable to real problems and capable of being handled on the machines. Training in the interpretation and use of the results would be an important part of this type of program. (Moore et al., 1956, pp. 65-66).*

Moore did establish two business statistics courses that featured computer processing at the University of Alabama, even though the university did not possess a computer at the time. However, in 1957, the College of Engineering at Mississippi State University had purchased an IBM 650. Fred Davis, Director of the Computing Center at MSU, made computer time available to Moore's Alabama students at nights. The class began making weekly trips eighty miles west to the Mississippi State campus in Starkville. As Moore (2013, p. 35) recalls, "It was like we were on our own. The students had a ball. We'd stay [in Starkville] sometimes until 10 p.m., and our wives would call asking where we were". The weekly treks continued until the University of Alabama purchased a UNIVAC in 1960. For Moore, the amount of time and trouble was worth it to instruct students to be more than just future computer operators, but to use their computing skills to impact the direction of business operations ("Electronic data processing course set at university", 1958).

## III. FOUNDING THE BIS PROGRAM AT MISSISSIPPI STATE UNIVERSITY

Moore's efforts did not go unnoticed, and, in 1963, he was hired at Mississippi State University to develop a program in business statistics and computing. The impetus for the new program came from the Dean of the College of



Business, Bill Flewellyn, who wanted to introduce computing in his school. Moore had a similar perspective: he noted that “other business schools were asleep at the switch, leaving computers to engineering, physics, and mathematics departments” (Moore, 2013). However, Moore saw a bigger opportunity than simply introducing a program on business statistics, and he drew inspiration from his navy background. He wanted the new program to fully develop the concept of business information systems (BIS) as a means to process raw data into useful information for business decisions. By the term “business information systems”, the emphasis would be on providing useful, valuable, unique, perishable, portable, and presentable information to support the functional areas of a business. Moreover, by integrating a computing major into the business curriculum, students would learn to exert control over traditional business processes such as payroll and inventory, as opposed to merely providing “listing reports” for those processes like he encountered in his naval career. Overall, the objective for the new program was to turn students into competent systems developers to support business organizations.

The first classes offered in the new program were aimed at systems development. Both FORTRAN and COBOL programming courses began, as did a course specializing in an interpretive language jointly developed by Shell Oil and Bell Labs, which was known as “ShellBell” (Gray, 1962). These courses were included with a course titled “introduction to data processing”, which engineering professor Jim Curry initiated. Early on, Moore also developed a computer application named the Statistical Program to Assist in Teaching Statistics (or SPATS) for students to generate samples of data and conduct various statistical analyses. SPATS was written in FORTRAN and found its way into both undergraduate and graduate BDP/BIS courses (Moore, 1973). By taking such courses alongside other business school offerings, students learned to provide more than just statistics; they were trained to use the information produced through the systems they developed to provide managerial insights toward improving traditional business processes.

Early support for the new program came from various state businesses that were interested in incorporating computer processing. Companies such as Blue Cross/Blue Shield and Mississippi Farm Bureau Insurance frequently invited Moore and his classes to tour their facilities in Jackson, MS. Other organizations, such as the Mississippi Hospital and Medical Service of Jackson, coordinated with Moore to establish summer internships for his students (“Summer internships set in data processing here”, 1965). Business computing was quickly becoming an interest for business leaders around the country, and Moore’s pioneering efforts were attracting attention. To aid his continuing work on business technology education and the development of the SPATS program, the IBM Systems Research Institute awarded Moore with a faculty fellowship in 1967.

In an effort to recruit students to help meet the demand for quality computing professionals, Dean Bill Flewellyn’s office publicized the new program both locally and at junior college campuses around the state. Many of the first students to major in business statistics and data processing came from the electrical engineering program. Other students, such as Kirk Arnett, were math majors who came to find that they enjoyed the logic more than the numbers, so the new major gave them a chance to pursue that. The first graduating class in 1966 was composed of five students. In the late 1960s, the program description (likely written by Moore) provided in the university’s course bulletin described a program with a strong emphasis on business statistics, with required courses including “business statistics using computers”, the aforementioned “business data processing”, and “data processing systems”.

*A relatively new but fast growing field is electronic data processing. Business, industrial, governmental, and military establishments are actively seeking persons with the necessary aptitude, professional education and experience for careers in this field.... This program of study provides a basic foundation in data processing, business statistics, accounting, and mathematics which is considered essential for a successful career in data processing. (MSU Bulletin, 1969)*

For his part, Charles Moore continued to share his vision of business information systems with others outside his university. He presented papers on technology curricula and instructional methods at multi-disciplinary conferences throughout the 1960s and 1970s (e.g., “Dr. Moore to present paper in England”, 1974; “Summer internships set in data processing here”, 1973). Moore’s goal with most of these presentations was to broaden awareness of the business information systems field and to confer with others on appropriate courses, methods, and technologies on which to instruct current students and future IS professionals.

The program and its curriculum remained largely unchanged until the early 1980s, when efforts to integrate disparate information systems programs around the world with an overall business curriculum began to gain momentum (Nunamaker, Couger, & Davis, 1982). In addition to the existing pre-requisites of statistics and programming and the need for core business courses, a new emphasis on managing organizational information, establishing project team work, and developing communication skills was called for. Accordingly, several BIS

courses at MSU were renamed, created, and modified to provide opportunities for students to gain experience in those areas. The program description was also altered to reflect the changing times:

*Business, industrial, governmental, and military establishments are constantly seeking persons with the necessary aptitude, professional education, and experience for careers in the fast growing field of electronic data processing and information systems for management.... The purpose of the BIS program is to solve business problems where the solution normally involves the use of a computer.... Since the student will be expected to solve business related problems, he/she must have a broad background and understanding of the business environment including such topics as Accounting, Economics, Law, Management, Production, Marketing, Finance, and Communications. This particular combination of skills is highly desired by prospective employers. (MSU Bulletin, 1984)*

The model curriculum for undergraduate programs developed by international IS professional organizations continued to evolve with changing technologies, platforms, and business needs, and the BIS program at MSU continued to change with the times as well. In accordance with the recommendations for improving theory-based instruction put forth by organizations such as the Association for Computer Machinery and the Association for Information Systems (Bacon & Fitzgerald, 2001; Couger et al., 1995), course offerings such as “structured systems analysis and design”, “microcomputers and networking”, “business database systems”, “decision support and expert systems”, and “advanced languages” (a course in Web development) were implemented at MSU in the 1990s. Variations of those courses and others (e.g., “business information system security”) are taught in today’s (as at 2014) BIS course curriculum. Tables 1 and 2 show the BIS required and electives courses for 2014, along with the required and electives courses for the Master of Science in Information Systems (MSIS) at MSU. Students are exposed to instruction that meets both the demands of local and regional employers and the ever-changing requirements expected by national and global organizations (Topi et al., 2010) because all BIS undergraduate students take about 4 different programming courses (i.e., visual basic programming, introduction to business COBOL, advanced languages I (Web programming); and advanced languages II (currently iOS)). In particular, the iOS programming course that MSU has offered since the late 2000s was one of the first of its kind, developed in large part to meet the timely demand of mobile application development.

Continuing dialogue between faculty and IS practitioners should be sustained and encouraged (Rockart, 1984). In order to keep MSU’s BIS curriculum current and reliable for potential employers, the BIS faculty developed the BIS Advisory Board around 2005 to help strengthen the ties between the program and the outside business and IS leadership communities. Faculty update BIS Advisory Board members on a variety of classroom topics, and board members provide feedback from the employer’s point of view. A small number of outstanding BIS students are selected to make presentations at the board meeting on projects the students have done in class, on internships they have completed, and on entrepreneurial ventures.

#### IV. CONCLUSION

Over the past five decades, numerous faculty have taught in the BIS program at Mississippi State University. Starting when he was hired in 1963, Charles Moore was the sole BIS instructor for nearly twenty years and was responsible for procuring the first personal computer on campus in 1979. He continued to teach in the program (later renamed “business information systems” in 1983) until retiring in 1984. Kirk Arnett graduated from the BIS program in 1967, later earning a PhD in the graduate BIS program and serving on the BIS faculty beginning in 1985. Other long-time BIS faculty members at MSU include J. P. Shim, who joined in 1984 and taught at Mississippi State for 27 years until 2011, and Rodney Pearson, who joined in 1987 and still teaches in the program as of 2014. In the fifty years since the program’s establishment, 1,953 students have graduated with a total of over 2,000 degrees in information systems (undergraduate, MSIS, and PhD).

Charles Moore’s pioneering efforts in the area of information systems education are enduring, but his view of what information systems can provide for businesses lives on in the program at MSU today. The program’s goal continues to be to “arm students with technology so that they will compete favorably in the marketplace” (Todd, McKeen, & Gallupe, 1995), a principle that Moore instilled in the program from day one. Fittingly, every year since 2009, the top MSU student majoring in business information systems is awarded with the Moore Award for BIS Excellence. Students are considered for the Moore Award based on their scholarship and leadership, with the consensus top-performer chosen by the faculty receiving a financial award provided by the Moore family. Three of the five winners have been 4.0 graduates. All have worked in internships and have been involved in student organizations. Following his lead, several BIS faculty have made similar contributions (i.e., annual scholarships for undergraduate students) to MSU’s BIS programs.



**Table 1: 2014 Undergraduate Business Information Systems Curriculum**

<b>BIS required courses</b>	
BIS 1012	Intro business information systems: hands-on applications course; Introduction to Information Systems
BIS 1733	Visual basic programming: first programming class, currently using Visual Basic 2010
BIS 1753	Intro to business COBOL: second programming class, currently using Unix-based OpenCOBOL
BIS 3233	Management information systems: MIS class for all College of Business students
BIS 3523	Advanced languages I: third programming class, covering HTML, CSS, PHP, Javascript, jQuery, AJAX
BIS 3753	Business database systems: coverage of SQL and Oracle databases
BIS 4753	Structured systems analysis and design: project-based class, including significant group systems project
BIS 4763	Senior seminar: current topics of the day
<b>Two of the following four BIS electives</b>	
BIS 4113	BIS security management: one of the focus areas of MSU BIS, follows CISSP study guide
BIS 4513	Microcomputers and networks: hardware-oriented class; experience building and maintaining LANs
BIS 4523	Advanced languages II: fourth programming class; various languages, currently Objective-C (iOS)
BIS 4533	Decision support systems: systems which provide users with quantitative and qualitative information
<b>12 hours of computer-related electives</b>	<b>4 hours of free electives</b>
Computer science elective	
Computer-related elective	
Computer-related elective	
Computer-related elective	

**Table 2: 2014 Graduate Master of Science Information Systems (MSIS) Curriculum**

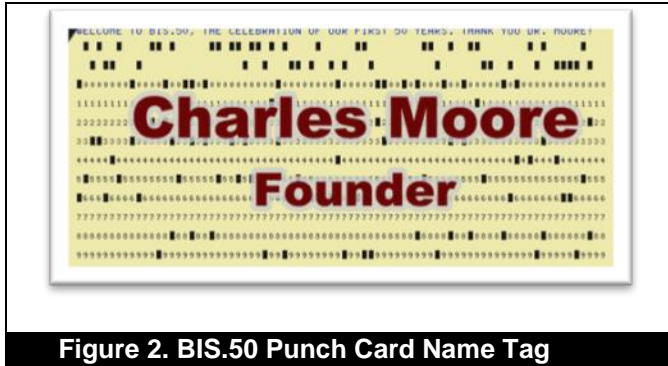
<b>MSIS Required Courses</b>	
BIS 8112	Management information technology and systems: management-focused MBA-style MIS concepts
BIS 8213	Advanced systems analysis and design: project-based class, including significant group systems project
BIS 8313	Advanced database design administration: coverage of SQL and Oracle databases
BIS 8513	Business telecommunications: telecommunications and networking concepts and techniques
BIS 8613	MIS administration: survey of Information Systems as they relate to managing the modern organization
BIS 8753	Information systems collaborative project: group project associated with a real life" business organization
<b>Two of the following four BIS Electives</b>	
BIS 6113	BIS security management: one of the focus areas of MSU BIS, follows CISSP study guide
BIS 6513	Microcomputers and networks: hardware-oriented class; experience building and maintaining LANs
BIS 6523	Advanced languages II: fourth programming class; various languages, currently Objective-C (iOS)
BIS 6533	Decision support systems: systems which provide users with quantitative and qualitative information
<b>7 hours of free electives</b>	
Note: Graduate MSIS curriculum (offering both on-campus and online distance programs)	

On November 15, 2013, MSU faculty, administration, staff, students, and alumni took the opportunity to honor Moore and his vision by celebrating the 50<sup>th</sup> anniversary of the founding of the business information systems program. As you would expect, any event of this magnitude—celebrating the vision of a true pioneer—took planning and the



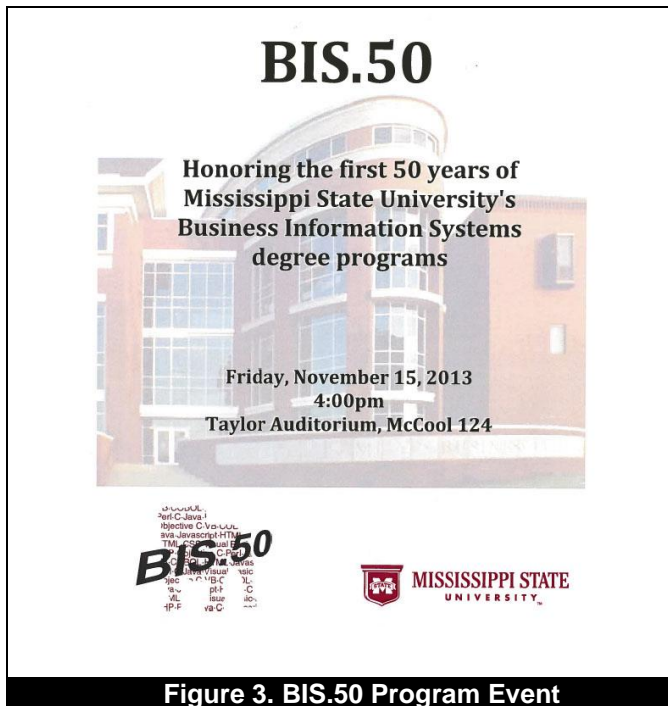
efforts of many. The planning committee (management and information systems professors and instructors) compiled a list of the approximately 2,000 graduates of the program over its 50-year life, including mailing addresses and email addresses (to the extent possible). Every graduate was invited to the celebration, along with current students, faculty, and administrators in business information systems, the College of Business, and the university at large.

Many items in the event were historically themed, such as the personalized "punch card name tag" made for each attendee (see Figure 2). Other giveaways included a 4GB wristband flash drive—the equivalent of 50 million 80-character punch cards—and a program listing each of the program's graduates. Even the decorations for the evening were historically and computing-themed, with centerpieces displaying 50 year-old hard drive platters, 132-column fan-fold paper, 1950s, 60s, 70s and 80s books, papers, and hardware, and more.



**Figure 2. BIS.50 Punch Card Name Tag**

Over the course of the evening (see Figure 3 for the flyer of the event), several speakers recounted the early days of the program, such as Professor Emeriti Kirk Arnett and Professor Charles Moore, who was introduced by one of his first teaching assistants, retired U.S. Army Colonel Norman Williamson. Attendees sat in close attention as they listened to the BIS program's origin, its evolution, and its continual development described by the people who experienced the program in its infancy. Each of the speakers left little doubt that the program had made an impact on the university, the state of Mississippi, and on themselves personally. For their part, the audience seemed to strongly agree with those sentiments.



**Figure 3. BIS.50 Program Event**

We hope that sharing MSU's fifty-year program history (i.e., from punch card to business data processing to business information systems) with the IS community will enrich our information systems history perspective by identifying early contributions made to the IS education footprint. Surely enough, the IS field is in a dynamic period of



improvement and fast-changing technology environment, and it is important that we reflect on our history while continuing to provide high-quality and world-class education to meet the needs of the IS community.

## ACKNOWLEDGMENTS

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## REFERENCES

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**J. P. Shim** is Executive Director of Korean-American Business Center and a faculty of Computer Information Systems at Robinson College of Business at Georgia State University. Before joining at GSU in 2011, he was faculty of BIS and Larry and Tonya Favreau Notable Scholar at Mississippi State. During the past 27 years at MSU, he has received 17 outstanding faculty awards, including 1994 John Grisham Faculty Excellence awardee, 2006 Powe Research Excellence award winner, and winner of 2011 MSU Diversity award. He led the BIS doctoral program from 1984-2011. He created and led MSU's International Business Strategy Program. He is Professor Emeritus of BIS at MSU. He has published five books and seventy journal articles. His coauthored paper has been cited as top in SSCI and Elsevier citations, and downloads in DSS. He serves on Wireless Telecommunication Symposium as Program chair and served on 2013 AMCIS Program co-chair. He has received grants, including NSF, Microsoft, U.S. SBA, Mississippi IHL, Japan Foundation, and Korea Foundation. He has been interviewed by the media (CBS TV, AP, AJC) and worked as a consultant for Booz Allen, EPA, Rehabilitation Associates, Kia Motors, and Kia Tier 1 companies. He is teaching Business Telecom and MBA Managing Information Technology at GSU. His research interests are BYOD, Call Analytics, and Social Networks.

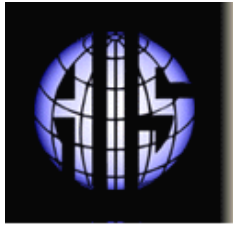
**Rodney Pearson** received his undergraduate degrees in Computer Science and Accountancy, as well as his M.B.A., from the University of Mississippi. He received his Doctor of Business Administration in Computer-Based Information Systems from Harvard University. While at Harvard, he worked for four years as a case writer in the fields of information systems and accounting. Dr. Pearson taught at Boston University for three years before coming to Mississippi State in 1987. During his years at Mississippi State, he has taught a wide range of courses, including COBOL programming, advanced languages I and II, microcomputers and networks, and management of information technology. He has received numerous college and university teaching awards, including awards as the Outstanding Undergraduate Teacher in the College of Business and Industry, Outstanding Service in the College of Business and Industry, Outstanding Faculty Member in the College of Business and Industry, the MSU Alumni Association Upper Level Undergraduate Teaching Award, and the university 2002 Grisham Master Teacher Award. He recently completed fifteen years of service to the state of Mississippi, serving three terms on the Board of the Department of Information Technology Services. He currently serves as MSU's Coordinator for Student Success.

**Kent Marett** is himself a graduate of the Business Information Systems program at Mississippi State University, where he now serves on the faculty as an Associate Professor. He received his PhD in Management Information Systems from Florida State University and taught previously at Washington State University. His research is primarily focused on online deceptive communication, information security, the use of technology by work groups, and human-computer interaction. His research has been published in several leading journals, including *MIS Quarterly*, *Information Systems Research*, *Journal of Management Information Systems*, *Journal of the Association for Information Systems*, and *IEEE Transactions on Professional Communication*.

**Charles Moore** is Professor and Head Emeritus of Business Information Systems and Quantitative Analysis (BISQA) at Mississippi State University. He served in the Navy 1942-45, then earned his MBA in accounting from the University of Alabama in 1948, and stayed at the university as an instructor (and, later, associate professor) of Business Statistics 1948-1963. He also earned his PhD in Business Statistics from the University of Michigan. Joining the MSU faculty in the fall of 1963, he started the Business Statistics and Data Processing (BSD) program at MSU, the first information systems program in an accredited college of business in the world. He was MSU's sole information systems professor for almost 20 years. He retired from Mississippi State in 1984 and, at the age of 98, remains highly interested in the IS field.

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