Dissertation leadership knowledge transfer using sparsely connected networks with bidirectional edges: case study of Chester Hayden McCall Jr., his dissertation advisors, and his students

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Abstract

There are many modes of information flow in the sciences: books, journals, conferences, research and development, acquisition of companies, co-workers, students, and professors in schools of higher learning. In the sciences, dissertation students learn from their dissertation advisor (or chairperson or mentor) and the other dissertation committee members and vice-versa; the committee members learn from the student. The students learn technical knowledge and discipline from their advisors. They learn to be researchers so they can be leaders of projects, industry, and academia, but do they learn how to discipline another generation of doctoral students? This paper is focused on the academic networking of dissertation students and their advisor(s); using the author's dissertation advisor, Chester Hayden McCall Jr., as an example. This paper asks the question: How is specific dissertation leadership knowledge being transferred? And continues with a discussion of network science and suggests four possible answers.

Introduction

The doctoral degree has been in existence for more than eight centuries (Noble, 1994). The name *doctor* was interchangeable with professor and teacher, and has conferred the ability to teach upon its recipients since a papal bull of 1292 (*ius ubique docendi*), delivered by Pope Nicholas IV (Noble, 1994; Radford, 2001). The doctor of philosophy (Ph.D.) degree was used in Europe since the early 19th century and was also abbreviated D.Phil. It was first awarded in the US by Yale University in 1861 (Noble, 1994; Radford, 2001; Baez, 2002). The first awarded Ph.D. *in education* was awarded in 1893 at Teachers College, Columbia University (Brown, 1990; Mason, 1998). Although Eells (1963) claims that it was given by Clark University in 1892 (Mallette, 2010). Through a series of databases (such as the Mathematics Genealogy Project (Math, 2011), and conversations, this paper attempts to document the formal education path where various mathematicians in history have been linked by their doctoral studies.

Leadership Question

Dissertation students learn from their dissertation advisor; they learn to be researchers so they can be leaders of projects, industry, and academia, but do they learn how to discipline another generation of doctoral students? Many student become dissertation advisors; and that skill was not learned in a *How to be a Dissertation Advisor* class. Similarly, there is no *How to be a University professor* class. Yet many doctoral students become teachers and produce doctoral students of their own. This paper will not answer the question: *How is specific leadership knowledge being transferred?* completely, but will suggests four possible answers: learning by 1) procedure, 2) instruction, 3) committee, and 4) doing.

Example for This Paper

'Chet' McCall was the author's dissertation advisor (Mallette, 2006). Chet passed away in 2011 and the author became reflective about his and Chet's educational genealogy. This article was written, in-part, to share Chet's dissertation advisor genealogy with his 107 dissertation students. Chet's dissertation advisor (Frank Weida), and Frank's dissertation advisor (Henry Rietz), and Henry's dissertation advisor (George Miller) are listed in Figure 1.

This is not a complete study; there may be some errors or the information may be incomplete. Each 'generation' of advisors is discussed in chronological order below, providing a short biography, their education, research and teaching history, and their own dissertation students.

George Abram Miller

George Abram Miller (1863-1951) was born near Lynville, Pennsylvania and married Cassandra Boggs in 1909. She died in 1949 and they had no children (Brahana, 1957).

Education

Miller received his B.A. (with honorable mention) and M.A. from Muhlenberg College in Allentown Pennsylvania in 1887 and 1890 respectively, and his Ph.D. from Cumberland

University in Lebanon Tennessee in 1892. He also received the D.Litt. (honorary Doctor of Letters) degree from Muhlenberg College in 1936 (Brahana, 1957).

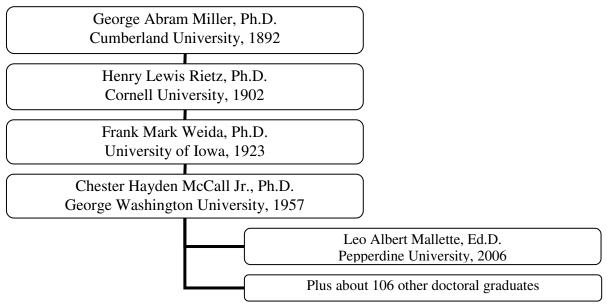


Figure. 1. Dissertation Advisor Genealogy of Chester Hayden McCall Jr.

Interestingly, Miller "was registered as a graduate student at Cumberland [University] ... but graduate work could be taken by correspondence.... A thesis was a requirement for the degree, but examinations in the advance courses could be substituted for the thesis" (Brahana, 1957, p. 259) and Miller's Ph.D. "did not require an original thesis" (Personal Communication, Amber Woodard at Cumberland University Library, December 05, 2011). Therefore, Miller had no dissertation and no advisor. However, many would draw a dotted line to Frank Cole as his advisor; due to a strong connection in Miller's intellectual heritage. Immediately after receiving his Ph.D., Miller was an Instructor at the University of Michigan from 1893 to 1895. Brahana (1957), Gap (2011), and the Mathematical Association of America (MAA, 2011a) state that Miller lived in the home of, and was influenced by, Frank Cole. Miller became fascinated with the mathematical theory of groups and his association with Frank Cole significantly influenced the remainder of his career – hence the dotted line from Cole to Miller. Cole's own advisor genealogy (Appendix A) traces back through very famous mathematicians such as Klein, Lipschitz, Poisson, Fourier, LaGrange, Laplace and Euler (Math, 2011).

Research and Teaching

Miller was a professor of mathematics at Eureka College (1888-1893) while studying for his Ph.D., and became an Instructor at the University of Michigan (1893-1895), attended lectures by Sophus Lie and Camille Jordan in Europe (1895-1897), was an assistant professor at Cornell University (1897-1901), assistant and associate professor at Stanford University (1901-1906), associate professor and professor at the University of Illinois at Urbana-Champaign (1906-1931). He became professor emeritus in 1931 and continued coming to his university office until 1950. He continued publishing until 1947 when, at the age of 84, his hand could not write legibly (Brahana, 1957). He wrote or co-wrote four books including *Determinants*, *Historical*

Introduction to Mathematical Literature, Theory and Application of Finite Groups, and approximately 820 scholarly articles on research, group theory, mathematics and the history of mathematics. This includes 70 articles for the *American Mathematical Monthly* where he holds the record for number of contributions (MAA, 2011a). In a 1912 letter H. E. Slaught stated:

In fact, I do not know what we [the *American Mathematical Monthly*] should have done without the editorial co-operation of Professor Miller. He is doing, in my judgment, a very valuable piece of work. The articles which he contributes cannot fail to be of great value to the ordinary college teacher of Mathematics, and the spirit in which he does it is one of such power and devotion to the cause that it cannot fail to elicit the commendation of all who are disposed to look at the matter seriously. (MAA, 2011a, p. 1)

Miller was a member of the American Association for the Advancement of Science, the National Academy of Sciences, and the American Academy of Arts and Sciences (MAA, 2011a, p. 1). Brahana's (1957) biography of Miller includes all of his publications.

Doctoral Students

Miller, a mathematician, had at least 14 dissertation students; three were at Cornell University, one at Stanford University, and eleven at the University of Illinois at Urbana-Champaign (Brahana, 1957; Math, 2011; ProQuest, 2011).

Cornell University.

- 1. Harry Waldo Kuhn, 1901, On Primitive Substitution Groups
- 2. William Benjamin Fite, 1901, On Metabelian Groups
- 3. Henry Lewis Rietz, 1902, On Primitive Groups of Odd Order

Stanford University.

4. William Albert Manning, 1904, Studies on the Class of Primitive Substitution Groups

University of Illinois at Urbana-Champaign.

- 5. Elizabeth Ruth Bennett, 1910, *Primitive Groups with a Determination of the Primitive groups of Degree 20*
- 6. Josephine Elizabeth Burns, 1913, The Abstract Definitions of Groups of Degree 8
- 7. Edward August Theodore Kircher, 1914, Group Properties of the Residue Classes of Certain Kronecker Modular Systems and some Related Generalizations in Number Theory
- 8. Louis Clark Mathewson, 1914, *Theorems on the Groups of Isomorphisms of Certain Groups*
- 9. George Rutledge, 1915, *The Number of Abelian Subgroups of Groups Whose Orders are the Powers of Primes* [Dissertation not listed in ProQuest (2011) database]
- 10. Beulah Armstrong, 1921, *Mathematical Induction in Group Theory* [Dissertation not listed in ProQuest (2011) database]
- 11. William Edmund Edington, 1921, Abstract Group Definitions and Applications
- 12. Harry Albert Bender, 1923, Sylow Subgroups in the Group of Isomorphisms of the Prime Power Abelian Groups

- 13. Francis Edgar Johnston, 1926, Transitive Substitution Groups Containing Regular Subgroups of Lower Degree
- 14. Charles Hopkins, 1927, Non-Abelian Groups whose Groups of Isomorphisms are Abelian

Miller's third doctoral student at Cornell University (Reitz) continues the advisor genealogy of this paper.

Henry Lewis Rietz

Henry Lewis Rietz was born in Gilmore, Ohio on August 24, 1875 and died in Iowa City, Iowa on December 7, 1943. He was the son of Jacob and Tabitha Jane Rietz (Crathorne, 1944).

Education

Reitz received his B.S. from Ohio State University in 1899 (MAA, 2011b) and his Ph.D. from Cornell University in 1902. The title of his 99-page dissertation was *On Primitive Groups of Odd Order* (Proquest, 2011). A copy of his dissertation's title page can be seen near this paragraph and the first 30 pages of his dissertation can be viewed at: http://www.archive.org/details/cu3192403218 9692

ON PRIMITIVE GROUPS OF ODD ORDER A THESIS PRESENTED TO THE UNIVERSITY FACULTY OF CORNELL UNIVERSITY IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY BY HENRY LEWIS RIETZ BALTUPORE Sp. Rest Welterer Primes the support of the

Research and Teaching

Rietz taught at Butler College (1902-1903) after receiving his Ph.D. Rietz left Butler College and \dots

was an instructor and professor at the University of Illinois from 1903 to 1918. From Illinois he moved to the University of Iowa as professor and head of the mathematics department in 1918. He held both positions until he retired in September 1943. At the same time, he worked as an actuary and consultant for several organizations. Rietz published more than 150 papers and at least eleven books. (MAA, 2011b, p. 1)

Reitz's books included Handbook of Mathematics and Statistics, Mathematics of Finance, School Algebra, Mathematical Statistics, College Algebra, Plane and Spherical Trigonometry. In his paper: On the history of Statistics and Actuarial Science at the University of Iowa Robert Hogg (2003) states that

...in 1905 [Rietz] started publishing some stat[istics] papers. And that increased through about 1910. And then in 1011 he published "On the Theory of Risk." It had good probability, good math stat, but this was sort of his beginning with Actuarial Science.

And then he continued to establish himself as a scholar in Mathematical Statistics and Actuarial Science. (Hogg, 2003, 3rd paragraph)

Doctoral Students

Reitz, a mathematician, had at least 14 dissertation students at the University of Iowa (Math, 2011; ProQuest, 2011).

- 1. John Franklin Reilly, 1921, Certain Generalizations of Osculatory Interpolation
- 2. Frank Weida, 1923, The Valuation of Life Annuities with Refund of an Arbitrarily Assigned Part of the Purchase Price
- 3. Clarence de Witt Smith, 1928, On Generalized Tchebycheff Inequalities in Mathematical Statistics
- 4. Herbert Albert Meyer, 1929, On Certain Inequalities, with Applications in Actuarial Theory
- 5. Samuel Wilks, 1931, On the Distributions of Statistics in Samples from a Normal Population of Two Variables with Matched Sampling of One Variable
- 6. Allen Thornton Craig, 1931, On the Distributions of Certain Statistics
- 7. Carl Fischer, 1932, On Correlation Surfaces of Sums with a Certain Number of Random

Elements in Common [Dissertation not listed in ProQuest (2011) database]

- 8. Arthur Ollivier, 1935, Some
 Mathematical Developments
 Underlying the Analysis of General
 Death
- 9. Floyd S. Harper, 1936, *An Actuarial Study of Infant Mortality*
- 10. Abraham C. Olshen, 1937, Transformations of the Pearson Type III Distribution
- 11. Lloyd A. Knowler, 1937, Actuarial Aspects of Recent Old Age Security Legislation
- 12. Franklin E. Satterthwaite, 1941 (or 1942 per ProQuest (2011)),

 Developments on the Theory of ChiSquare
- 13. William Darragh Berg, 1941 (or 1942 per ProQuest (2011)), Theorems on Certain Type-A Difference-Equation Graduations
- 14. Louis Garfin, 1942, On Pension Fund Reserves

Reitz's second doctoral student (Weida) continues the advisor genealogy of this paper.

The Valuation of Life Annuities With Refund of an Arbitrarily Assigned Part of the Purchase Price BY FRANK MARK WEIDA B.Sc., Kenyon College, 1913 THESIS SUBMITTED IN PARTIAL FULFILLMSOPHY IN MATHEMATICS, IN THE DEGREE OF DOCTOR OF PHILLOSOPHY IN MATHEMATICS, IN THE GRADUATE COLLEGE OF THE STATE UNIVERSITY OF 10WA. JULY, 1869. Begins from State of Mathematica Financials and VII—Vel. 7, No. 13, Genrale Giagno, 1925

Frank Mark Weida

Frank Mark Weida was the son of the Rev. George Francis Weida. George was appointed Bowler Professor of Chemistry and Physics at Kenyon College in 1907 (Greenslade, 2011).

Education

Weida graduated from Kenyon College in 1913 (Greenslade, 2011) and received his Ph.D. from the University of Iowa in 1923. The title of his 35-page dissertation was *The Valuation of Life Annuities with Refund of an Arbitrarily Assigned Part of the Purchase Price* (Proquest, 2011). A copy of his dissertation's title page can be seen near this paragraph.

Research and Teaching

In his paper: On the history of Statistics and Actuarial Science at the University of Iowa Robert Hogg (2003) states

The reason I want to mention Frank Weida is because when he left here, he went to George Washington University. And in 1935 he established the first Department of Statistics as we know it. There were statistical groups in Business, but this was the first Department of Statistics in Liberal Arts and/or Science.... And so THIS was the first Department of Statistics. (Hogg, 2003, 6th paragraph)

Weida authored or co-authored several books, including *Statistics with application to highway traffic analysis*; and *Statistical inference, reliability, and significance.*

Doctoral Students

Weida, a mathematician, had at least 11 Ph.D. and Ed.D dissertation students at the George Washington University (GWU, 2011).

- 1. Solomon Kullback, Ph.D., 1934, An Application of Characteristic Functions to the Distribution Problem of Statistics
- 2. Harold Glen Clark, Ed.D., (Weida with other advisors), 1942, *An Occupational Study of Personnel Workers in Selected Agencies of the Federal Government*
- 3. Joseph Bueol Johnson, Ed. D., (Weida with other advisors), 1946, *The Problems Involved in the Administration of an Audio-Visual Program*
- 4. Walter William Jacobs, Ph.D., 1951, Random Matrices
- 5. Dalton Houston Wright, Ph.D., 1953, Survival Probability
- 6. Robert Tynes Smith III, Ph.D., 1956, A Stochastic Model for Economic Time Series
- 7. Hartley Linwood Pond, Ph.D., 1957, Some Relations Between Input and Output Power Spectra in Certain Nonlinear Systems
- 8. Chester Hayden McCall Jr., Ph.D., 1957, On Sequential Analysis as Applied to the Poisson and Pearson Type III Distributions
- 9. Harry Weingarten, Ph.D., 1959, The Law of Large Numbers and Related Theorems
- 10. Selig Starr, Ph.D., 1961, Some Algebraic Aspect of the Analysis of Variance

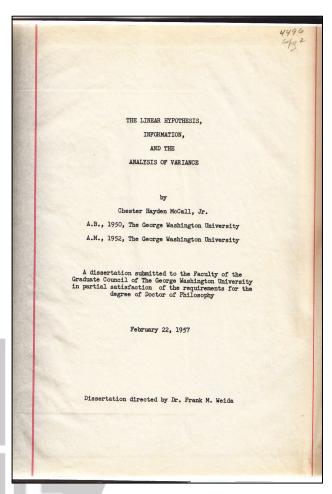
11. Howard Richard Roberts, Ph.D., 1962, Some Results in Life Testing Based on Hypercensored Samples from an Exponential Distribution

Weida's eighth doctoral student (McCall) continues the advisor genealogy of this paper.

Chester Hayden McCall Jr.

Chester 'Chet' McCall was born in Vandergrift Pennsylvania on August 6, 1927 and passed away on Thursday, March 3, 2011 in Los Angeles California. Park (2011) nicely summarized his early career that brought him to Pepperdine University.

After receiving his graduate degree in statistics at The George Washington University, McCall consulted for the military and aerospace industry for 13 years working for Booz, Allen, and Hamilton. While he loved the intense interaction with other leaders in the field, something was lacking. He decided to shift gears and consult in



the transportation, education, and health care industries and was employed at CACI, working with the Federal Transportation Department in Boston. While consulting in Los Angeles, McCall saw an ad for a one-day session at Pepperdine University in institutional management. He could not attend the information meeting so he sent a letter to the program director, Dr. Terence Cannings, expressing interest in enrolling in the program. To his surprise, a short while later, Cannings called his home requesting not an application, but a copy of his resume. After interviewing with Olaf Tegner, who was then the dean of GSEP [Graduate School of Education and Psychology] and Michele Stimac, then associate dean of curriculum, McCall joined GSEP as an associate professor in 1982, teaching management and statistics. (p. 1)

Education

McCall received his A.B., A.M. and Ph.D. from the George Washington University in 1950, 1952, and 1957 respectively. The title of his 90-page master's thesis was *The linear hypothesis*, information, and the analysis of variance. The title of his 140-page dissertation was *On sequential analysis as applied to the Poisson and Pearson Type III distributions*. A copy of his dissertation's title page can be seen near this paragraph. Frank Weida was McCall's advisor for both the master's thesis and the doctoral dissertation (GWU, 2011; ProQuest, 2011). Other

members of his doctoral committee were Florence Marie Mears, Everett Herschel Johnson, and Solomon Kullback (Weida's first doctoral student in 1934).

Research and Teaching

McCall's biographical sketch in his dissertation lists his job history in 1957 as: graduate assistant in statistics (1951-52), instructor in statistics (1952-56), Assistant professor of statistics (1956-), consultant to the Army Logistics Research Project and Historical Records Project (1956-), and consultant to Corn Industries Research Foundaton (1954-) (McCall, 1957, insert before page i).

Park (2011) writes that Chet:

... was one of three faculty members involved in the [School of Education's doctoral] organizational leadership program, which was then called the institutional management program. That year, they decided that a program director was needed, and the other two faculty voted McCall to the position while he unsuspectingly left the room during a meeting. McCall was the program director of organizational leadership for 13 years (1982-1995), during which time he was a source of inspiration to a great number of GSEP students. He is known for his unwillingness to settle for anything less than academic excellence, his open heart, and a fierce support of students' success. (p. 1)

Chet wrote several books including: Optimization Techniques for Computerized Simulation Models (1975), Sampling and Statistics Handbook for Research (1982), and Understanding Statistical Methods: A Manual for Students and Data Analysts (2000). Chet also dabbled in the real estate education field in the 1960s and 1970s when he wrote classics like: Complete guide to turning objections into real estate sales (1968), How any real estate salesman can turn himself into a selling giant (1969), How to use showmanship to multiply success at every step in selling (1974), and the ERC Real Estate Sales Course (1978).

Doctoral Students

Chet had over a hundred dissertation students between 1984 and 2008 (Appendix B). Many of Chet's students have gone into higher education, have been on doctoral committees, and have had their own dissertation students. Chet's students who have become professors include (in order of graduation) Drs. Kay Davis, Lois Blackmore, Farzin Madjidi, Donald Chick, Evelyn Robertson, Leo Mallette, and Mark Lieberman; and probably others. Norman Foster Ramsey, Jr. received half of the 1989 Nobel Prize in Physics and, in his autobiography for the Nobel committee, stated:

I have greatly enjoyed my years as a teacher and research physicist and continue to do so. The research collaborations and close friendships with my eighty-four graduate students have given me especially great pleasure. I hope they have learned as much from me as I have from them. (Nobel, 2011)

The author agrees with this symbiotic, bidirectional, learning relationship and he believes that Chet would have had similar sentiments. Chet's dissertation advisor genealogy is shown in Appendix C.

Application to Network Science

"Network science is an interdisciplinary academic field which studies complex networks such as engineered networks, information networks, ... and social networks.... [and] link analysis is a subset of network analysis, exploring associations between objects" (Network science, 2013, p. 1). The dissertation genealogy described in this paper is comprised of the people (advisors and students) and are "call[ed] vertices or sometimes nodes, with connections between them, called edges" (Newman, 2003, p. 2). The edges can be directional as in a citation matrix, or bidirectional as in a social network or in dissertation advisor-student networks. A graph showing dissertation advisors and their students (or a person's genealogy or Kevin Bacon number, or Erdős number) is a sparse network where there are a low number of edges compared to the total possible number of edges.

Dissertation Advisor Leadership

It is generally accepted that a doctoral degree is a prerequisite to being a dissertation advisor. The advisor can be both a manager (accepting/hiring students, creating schedules, meeting deadlines, attending meetings, writing reviews and recommendations, and guiding career paths) as well as a leader (advising, suggesting, looking to the future). The leadership style of the advisor could range from autocratic to bureaucratic to laissez-faire to transactional to servant leadership, or any of the dozen other names in the literature. All the leadership styles could possibly work to varying degrees as they do in industry. But what styles and skills will the student have when they become a dissertation advisor themselves and how much do they learn from their advisor? Here are four possible methods.

1) Learning by Procedure

Most universities have guidelines for the doctoral process. This generally includes classes that have to be taken, a comprehensive examination, literature is reviewed, research is proposed and approved, research is conducted and written up, and a portion of the faculty members review the work performed in a final oral examination. Policies and procedures provide guidelines for uniformity and minimum requirements.

- 2) Learning by Instruction. Some (usually online) universities have a specific dissertation advisor training class that is mandatory for professors before students can be accepted. This often requires annual refresher training, as policies and procedures evolve.
- 3) Learning by Committee. Many universities require professors to work on a number of committees (for example: 5) as a dissertation committee member before chairing a dissertation committee. Professors learn the procedures and policies from mature dissertation advisors.
- **4) Learning by Doing.** Professors have written their own dissertation and were guided by their advisor and by the members of their committee. They learned their university's requirements and how to do research from their advisor and may carry that philosophy forward to the schools where they teach. See the example below.

Example

The author's advisor was Chet McCall and Chet wrote, in his dissertation acknowledgements, about his advisor (Frank Weida): "His insistence on a lucid presentation with adequate examples has certainly served to improve this paper" (McCall, 1957, p. ii). The author, in-turn, wrote, in his acknowledgements, about his advisor: "Thanks for the reviews and making this the best and most clearly written dissertation that it could be" (Mallette, 2006, p. xvii). It is obvious that Weida insisted on his dissertation student (McCall) being lucid and in turn McCall insisted on his own dissertation student's (Mallette) writing be clear – Mallette is known to also be insistent on clarity in his dissertation students' writing. While these comments could reflect acknowledgements in many dissertations and the desires of all advisors, they stand out because they were specifically stated, and also form the basis for *learning by doing* – that dissertation students learn from their dissertation advisors and it forms a basis for future students.

The social sciences are interesting because the student often selects the topic and finds a professor who is interested enough in the topic to become their advisor – juxtaposed with physics or engineering where the student will often work in the advisor's laboratory on funded projects and prepare a dissertation based on the work performed in that laboratory. This is probably a key point where the professor should question the student about their plans for teaching at the doctoral level. This could put an added agenda item to the advisor's interaction with the student. Not only is the advisor guiding the student through the mechanics of a dissertation, and through the literature review and methods, but is also providing a *model* of a good advisor.

Summary

This paper asks *How is specific dissertation leadership knowledge being transferred?* and then suggests four possible answers: learning by 1) procedure, 2) instruction, 3) committee, and 4) doing. I've had the pleasure to know Chet McCall from my doctoral interview through and beyond graduation. He had that intelligent and sometimes mischievous sparkle in his eye and an ability to lead his dissertation students with a firm hand, without micromanaging them. Chet's dissertation heritage goes back to famous statisticians and, by Miller's association with Frank Cole, to some of the most influential mathematicians of the 18th and 19th centuries.

Author's Biography

Dr. Mallette provides technical and programmatic support at The Aerospace Corporation. Previously, he worked in system engineering and project management of satellite systems at the Boeing Company for 30 years. He received the BS and MS degrees in electrical engineering from the University of Central Florida and the MBA and Ed.D. (in organizational leadership, with honors) degrees from Pepperdine University. Dr. Mallette has published over 70 conference and peer-reviewed journal articles on atomic frequency standards, satellite systems, ground stations, optical detectors, root-cause investigation, genealogy, organizational ethics, publishing, and pruning trees. He is co-author of the book *Writing for Conferences* (Greenwood, 2011), coeditor of *The SPELIT Power Matrix* (CreateSpace, 2007), author of *Images of America: Rancho Mirage* (Arcadia Publishing, 2011), and the *Princess Avocado* series of children's e-books. Dr. Mallette is an adjunct faculty at Pepperdine University and the University of Phoenix's doctoral program and was an Instructor of Engineering at the University of Central Florida. Leo is a

senior member of the Institute of Electrical and Electronics Engineers, a member of the advisory board for the Precise Time and Time Interval Conference, and a board member of the Society of Educators and Scholars. He and his wife Kathy live in Irvine and Rancho Mirage, California. They have one daughter and two granddaughters. He enjoys playing with his granddaughters, gardening projects, traveling, and writing.

An early version of this paper was presented and published at a conference (Mallette, 2012).

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Appendix A

Dissertation Advisor Genealogy for Frank Cole

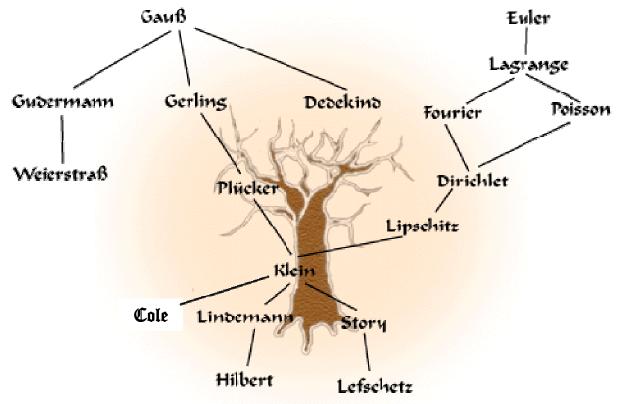


Figure A1. Home Page illustration from Mathematics Genealogy Project Website (Math, 2011) with Frank Cole superimposed in the figure. Cole had a strong influence on George Miller. Notes:

Lipshitz had a second advisor named Martin Ohm (brother of George who first described Ohm's Law).

Poisson had a second advisor named Pierre-Simon Laplace.

Gauß (English: Gauss) had another student named Friedrich Bessel.

Artwork used with permission (dated January 03, 2012) of the Mathematics Genealogy Project http://www.genealogy.math.ndsu.nodak.edu.

Appendix B

Dissertation Students for Chester Hayden McCall Jr.

1 - ANN W. WILKS-PENROD

Date of Final Oral: 11/28/84

Dissertation Topic: A Study of Academic Success Rate in Group Tutorial and Traditional Full Contact Hour Teaching Modes in an MBA Program for Experienced

Mid-Management Level Students

2 - BETTY J. HANSON

Date of Final Oral: 3/27/85

Dissertation Topic: A Comparative study of the Attitudes of Special Educators Toward the Computer-

Aided Individualized Education Program

3 - CHARLES A. HELMERS

Date of Final Oral: 4/10/85

Dissertation Topic: A Study of Written Composition Skills Improvement in Three Selected Approaches to Classroom Instruction at the Fifth and Sixth Grade

Elementary Level

4 - SANDY GILBERT ENGLANDER

Date of Final Oral: 7/9/85

Dissertation Topic: An Evaluation of Factors Affecting

Second Language Acquisition Using a "Natural

Approach" Methodology

5 - TERRI MULLEN

Date of Final Oral: 7/25/85

Dissertation Topic: Leader Questioning Techniques in

the Decision-Making Group Environment

6 - KAY DAVIS

Date of Final Oral: 4/1/86

Dissertation Topic: Resocialization to Professional

Nursing Practice

7 - LINDA M. THOR

Date of Final Oral: 4/8/86

Dissertation Topic: An Examination of Risk Management Strategies in Employment Training Performance Contracts in California Community

Colleges

8 - LOIS BLACKMORE

Date of Final Oral: 4/9/86

Dissertation Topic: Computerized, Adaptive Computerized, and Pencil-Paper Test Administration:

A Comparative Study in a High School Setting

9 - LAWRENCE D. HORNBAKER

Date of Final Oral: 4/9/86

Dissertation Topic: Effectiveness of Institutional Advancement Programs in Representative California Public and Private Colleges and Universities

10 -WILLIAM J. WATKINS

Date of Final Oral: 7/21/87

Dissertation Topic: A Study of Curriculum Enrichment

and its Effect on SAT Verbal and Math Scores

11 - KAREN B. HOLDEN-FERKICH

Date of Final Oral: 4/11/88

Dissertation Topic: The Job Training Partnership Act A

Program Evaluation

12 - SUSAN HARUMI BENTLEY

Date of Final Oral: 4/12/88

Dissertation Topic: Building an Effective High School

A Descriptive Study

13 - SARAH L. FELPS

Date of Final Oral: 4/14/88

Dissertation Topic: Computers As Learning Tools In

Higher Education-Projected to the Year 2000

14 - CYNTHIA FAYE GREER

Date of Final Oral: 5/18/88

Dissertation Topic: Legal Aspects of Sex Education in

the Public School System in the United States

15 - SUSAN MORGAN COTLER

Date of Final Oral: 7/20/88

Dissertation Topic: An Analysis of Demographic Characteristics of Community College Male/Female

Presidential Leadership

16 - SALLY HUGULEY

Date of Final Oral: 11/30/88

Dissertation Topic: An Investigation of Obstacles to Completion of the Dissertation and of Doctoral Student

Attitudes Toward the Dissertation Experience

17 - SHARMAN H. HOLMES

Date of Final Oral: 12/1/88

Dissertation Topic: A Comparative Assessment of Computer-Based Training (CBT) and the Traditional Industry Lecture Methodology Upon Job Performance

in Application Software Training

18 - MESSELE NEGASH

Date of Final Oral: 12/14/88

Dissertation Topic: A Study of the JTPA-Sponsored Programs in Four Southern California Service Delivery

Areas (SDAs)

19 - PATRICIA LANDAU

Date of Final Oral: 4/6/89

Dissertation Topic: A Study of the Competencies Needed for the Position of Classified Personnel

Director in Merit System School Districts in California

20 - ELIZABETH A. SCHUCK

Date of Final Oral: 4/5/90

Dissertation Topic: A Survey of Attitudes Toward Implementation of Year-Round Education in Anaheim

City School District

21 - ELENA M. BOVE

Date of Final Oral: 5/1/90

Dissertation Topic: Characteristics, Practices and Philosophical Precepts of Academic Support Programs

for NCAA Division IAAA Student Athletes

22 - KAREN KAWAI NAKAI

Date of Final Oral: 5/3/90

Dissertation Topic: An Exploratory Study of the Key

School as A Vehicle for School Renewal

23 - JOHANNA H. VETCHER

Date of Final Oral: 5/8/90

Dissertation Topic: The Utilization of Writing to Read and its Effects on Reading and Writing Skills of Kindergarten and First Grade Students

24 - SAUSAN FAHMY

Date of Final Oral: 12/6/90

Dissertation Topic: A Review Of Pay For Performance

In Private Industry And Higher Education

25 - RONALD BECHTEL

Date of Final Oral: 4/8/91

Dissertation Topic: A Study Of Academic Growth In Third Grade Students And Its Relationship To Year-

Round Education

26 - FARZIN MADJIDI

Date of Final Oral: 4/11/91

Dissertation Topic: Impact Of Economic Factors On Enrollment In Degree Programs For Non-Traditional

Students

27 - THOMAS E. HADDEN

Date of Final Oral: 4/23/91

Dissertation Topic: A Survey Of The Degree And Type Of Parental Involvement In The Education Of Their

Children In Lutheran Parochial Schools

28--EVANGELINE CHAVEZ RAMIREZ

STOCKWELL

Date of Final Oral: 4/23/91

Dissertation Topic: The Parenting Practices Of Four

Hispanic Subgroups

29 - DAVID KOMMER

Date of Final Oral: 7/22/91

Dissertation Topic: The Changing Role Perceptions Of Teachers, Counselors, And Administrators In A Middle

School Structure

30 - TIMOTHY STAATS

Date of Final Oral: 11/14/91

Dissertation Topic: The Importance Of Prosthetics

Information To The Amputee

31 - WALTER C. MILLER

Date of Final Oral: 3/27/92

Dissertation Topic: A Comparison of Institutional Objectives, Involvement And Activities With Respect To Enrollment Management In Four-Year State

Institutions of Higher Education

32 - DENISE DANNE

Date of Final Oral: 4/29/92

Dissertation Topic: Total Quality Management In Industry And Its Implications For Secondary Education

33 - ANGELA CLARK LOUQUE

Date of Final Oral: 7/17/92

Dissertation Topic: Participation Of Minorities In

Higher Education

34 - MARILYN WHEELER

Date of Final Oral: 11/10/92

Dissertation Topic: Gifted Education For Elementary

Students On A Year-Round Schedule

35 - VALERIE SHIELDS

Date of Final Oral: 11/10/92

Dissertation Topic: The Impact Of Selected

Intervention Practices On The Academic Performance, Behavior, And Attendance Of Identified At-Risk

Elementary School Students

36 - BONNY NICKLE GOODWIN

Date of Final Oral: 1/19/93

Dissertation Topic: A Study Of The Perceptions And Attitudes Exhibited By Distance Education Students And Faculty At The University of Phoenix OnLine Program

37 - PATRICK E. PETTIT

Date of Final Oral: 4/29/93

Dissertation Topic: A Study Of The Effects Of Participation In The Extended Year Choice Program

On Reading Comprehension Scores

38 - PAUL STANSBURY

Date of Final Oral: 5/7/93

Dissertation Topic: A Study Of Contract Training Marketing By Selected Western States' Community

Colleges

39 - KAREN SIDES

Date of Final Oral: 11/10/93

Dissertation Topic: An Exploratory Study Of The Characteristics And Attitudes Of Distance Learning

High School Facilitators

40 - JOAN BRAVO DE MURILLO

Date of Final Oral: 5/5/94

Dissertation Topic: Total Quality Management And Its

Implications For Middle School Education

41 - KEVIN KISTLER

Date of Final Oral: 1/9/95

Dissertation Topic: A Study To Establish The Need For

A Correctional-Specific Professional Education

Curriculum

BARBARA CAROLLO

Date of Final Oral: 5/4/95

Dissertation Topic: A Study Of Factors That Influence

Job Satisfaction Of School Psychologists

[completed final oral exam, but never completed

requirements for graduation.]

42 - ALAN BRANDENBURG

Date of Final Oral: 7/24/95

Dissertation Topic: An Analysis of Block Scheduling Models And Their Impact On A Positive School

Climate

43 - WAYNE LINGENFELTER

Date of Final Oral: 5/7/96

Dissertation Topic: Management Of Substance Abuse

Testing In The Workplace

44 - CELIA EDMUNDSON

Date of Final Oral: 5/9/96

Dissertation Topic: A Study Of Limited English Proficient Students And Computer-Assisted English

Reading

45 - K. SUE JACOBSEN

Date of Final Oral: 5/13/96

Dissertation Topic: Questioning Techniques Used By

Leaders Of Decision-Making Groups

46 - MARY SCOTT

Date of Final Oral: 11/27/96

Dissertation Topic: Business Marketing For Public

Schools

47 - ARACELY MORA

Date of Final Oral: 4/29/97

Dissertation Topic: Practices And Components Of Academic Support Programs For California College

Student Athletes

48 - CHRISTOPHER JONES

Date of Final Oral: 4/29/97

Dissertation Topic: Staff Members' Perceptions Of Middle School Culture In Middle Schools That Have

Implemented School Uniform Policies

49 - MOSTAFA MEHRABANI

Date of Final Oral: 4/30/97

Dissertation Topic: Application Of Total Quality Management (TQM) Within Information Technology

Organizations

50 - MICHAEL PRIOR

Date of Final Oral: 5/1/97

Dissertation Topic: The Impact Of Changing consumer Travel Preferences On Travel Design And Services In

New Zealand

51 - ERIK DAVID BLAINE

Date of Final Oral: 11/24/97

Dissertation Topic: An Analysis Of The Chief Student Affairs Officer In The California State University: Demographics, Functions, Roles And Career Paths

52 - TRUDY J. NAMAN

Date of Final Oral: 4/1/98

Dissertation Topic: Pastoring The Church Into The

Twenty-First Century

53 - LIZZIE L. BENTON

Date of Final Oral: 4/29/98

Dissertation Topic: Staff Development Training For Child Care Teachers Working With Prenatally

Substance Exposed Children

54 - SYLVIA GORDON ROUSSEAU

Date of Final Oral: 7/23/98

Dissertation Topic: The Culturally Relevant Dialogical Teacher-Student Relationship Between Children Of Color And White Teachers In American Schools

55 - CHARLENE DAVIS FOBI

Date of Final Oral: 9/30/98

Dissertation Topic: Identification Of Community-Based Clinical Competencies For Associate Degree Nursing

Practice

56 - RICHARD E. SAUTER

Date of Final Oral: 1/21/99

Dissertation Topic: A Study To Identify The Special Concerns And Curricular Needs Of The Professional Correctional Educator Of Youthful Offenders

57 - THELMA JAMES DAY

Date of Final Oral: 3/18/99

Dissertation Topic: A Study To Develop Executive Guidelines For The Successful Implementation Of The Welfare Reform Mandates In California Community College

58 - JACQUELINE PARKER SCOTT

Date of Final Oral: 3/18/99

Dissertation Topic: A Study Of The Impact Of A Parent Education Program On Recidivism Rates Of Male

Juveniles

59 - EVERETT O. HENRY

Date of Final Oral: 4/6/99

Dissertation Topic: How High School Students Choose To Use Computer Technology: A Case Study

60 - CATHLEEN MALEENONT

Date of Final Oral: 4/27/99

Dissertation Topic: A Glass Ceiling Within Banking

And Financial Institutions in Thailand

61 - DONALD CHICK

Date of Final Oral: 4/28/99

Dissertation Topic: A Case Study of The Naval Aviation Depot, North Island: Large Scale Change in

The Public Sector

62 - TERI GREENE

Date of Final Oral: 4/30/99

Dissertation Topic: Analysis Of Organizations Of

Learning As "Learning Organizations"

63 - JUDY ANN SMITH

Date of Final Oral: 09/30/99

Dissertation Topic: Equitable Inclusive Identification Practices for Underrepresented Student Populations in Gifted and Talented Education: A Delphi Study

64 - DONALD MARRIN

Date of Final Oral: 12/08/99

Dissertation Topic: A Study of the Career Choice Relevance of the Undergraduate Business Education at

Four Private Southern California Colleges:

Implications to the Curriculum

65 - SUSAN ADAMS

Date of Final Oral: 5/1/2000

Dissertation Topic: An Historical Study of Teacher

Salaries in California

66 - DOUGLAS HOUSTON

Date of Final Oral: 5/2/2000

Dissertation Topic: A Review of the Evaluation Processes and Strategies for Mentoring At-Risk

Students in the Middle School

67 - JENNIFER SCHENBAUM

Date OF final Oral: 5/3/2000

Dissertation Topic: The Foundation for a Leadership

Development Model: A Meta-Ethnography

68 - RANDI MILLER

Date of Final Oral: 07/28/2000

Dissertation Topic: Screening for Alcohol, Tobacco,

and Other Drugs During Pregnancy

69 - CATHY HASSON

Date of Final Oral: 9/11/00

Dissertation Topic: Building Bridges: A Survey Process

Approach To Organizational Effectiveness

70 - ED FOULK

Date of Final Oral: 12/6/00

Dissertation Topic: An Assessment Of Southern California Healthcare CEO's Attitudes Towards

Physician-Assisted Suicide (PAS)

71 - ROD JENSEN

Date of Final Oral: 4/5/01

Dissertation Topic: Luther Leadership: A 16th Century Model For 21st Century Organizational Leaders

72 - EARNESTINE THOMAS-ROBERTSON

Date of Final Oral: 7/11/01

Dissertation Topic: Globalizing Community College

Curricula

73 - EVELYN ROBERTSON

Date of Final Oral: 9/12/01

Dissertation Topic: Comparative Analyses Of Knowledge Management Practices In A United States Of America High Technology Multi-National

Corporation Located In China And High Technology

Firms In The U.S. Silicon Valley

74 - LINDA SMITH STEVENS

Date of Final Oral: 3/14/02

Dissertation Topic: Relational Study Of Registered

Nurses Critical Thinking Ability

75 - ROBERT LAXTON

Date of Final Oral: 3/25/02

Dissertation Topic: Quality Indicators Of Effective

Pupil Transportation Programs

76 - PHYLLIS VAN CROMBRUGGHE

Date of Final Oral: 3/26/02

Dissertation Topic: A Study To Obtain Opinions Of California Hospital Health Care Executives About Governmental Enforcement Of Fraud And Abuse

Regulations

77 - PHILLIP ROSENKRANTZ

Date of Final Oral: 3/27/02

Dissertation Topic: Executive Awareness And Corporate Use Of Statistical Methodologies

78 - TIN VAN NGUYEN

Date of Final Oral: 3/28/02

Dissertation Topic: Knowledge Management: Literature

Review And Findings About Perceptions Of Knowledge Transfer In Collaborative And Process

Oriented Teams

79 - SARAH WANJIRU NELSON

Date of Final Oral: 7/5/02

Dissertation Topic: How Teacher Characteristics And Their Perception Of Staff Development Relate To

Student Achievement In Colorado

80 - NORMAN HALL

Date of Final Oral: 11/25/02

Dissertation Topic: Designing A Digital Portfolio

Program At Greenville College

81 - TERRI LISAGOR

Date of Final Oral: 6/16/03

Dissertation Topic: The Art Of Science Education: Preparing Graduate Students Of The 21st Century To Teach Chemistry And Physics In College And

University Settings

82 - NANCY MILLER

Date of Final Oral: 6/25/03

Dissertation Topic: Nursing Program Attrition

83 - CHRISTOPHER YOUNG

Date of Final Oral: 6/30/03

Dissertation Topic: A Current Study Of The Alignment Of Expectations Between Employees And Employers

84 - KATHLEEN MACINNES

Date of Final Oral: 7/16/03

Dissertation Topic: Legal Issues Associated With The Consideration Of Assistive Technology For Special

Education Students

85 - CAROL TURNER

Date of Final Oral: 7/23/03

Dissertation Topic: A Descriptive Study Of Executive

Coaching For Strategic Organization Change

86 - JOAN MARQUES

Date of Final Oral: 10/10/03

Dissertation Topic: Spirituality In The Workplace: Establishing A Broadly Acceptable Definition Of This

Phenomenon

87 - BRIAN BRADY

Date of Final Oral: 12/3/03

Dissertation Topic: Governing California Water Districts: Decision-Making Skills For Board Members

88 - REGINALD SIRLS

Date of Final Oral: 3/31/04

Dissertation Topic: The Decline Of Standardized Test Scores At The Fourth Grade Level In The Inglewood

Unified School District

89 - VALERIE MARTIN

Date of Final Oral: 6/17/04

Dissertation Topic: Leadership Skills Development: Current Practices Within Christian High Schools To

Prepare Students For Leadership Roles

90 - RENEE ROMMERO

Date of Final Oral: 7/19/04

Dissertation Topic: Midlife Career Changes for Black

and Latina Women

91 - CAROL REECE

Date of Final Oral: 6/21/04

Dissertation Topic: A Study to Ascertain Employee Satisfaction with Reward Categories for Municipal Office Staff at Selected Cities with Population Under

67,000

92 - DIANE T. FIELLO

Graduation date: 2005

Aligning instruction to California fifth-grade English

language arts content standards

93 - ANTHONY ANDREOLI

Date of Final Oral: 2/22/05

Dissertation Topic: A Descriptive Study Examining the Settlement Rate of Paid Court Mediators versus Volunteer Court Mediators in Selected Counties

94 - MARY GILL

Date of Final Oral: 5/23/05

Dissertation Topic: Attitudes and Perceptions of New Principals: Utilization of Support Programs to Recruit

and Retain Highly Qualified Candidates

95 - EMMA GARCIA SALAS

Date of Final Oral: 6/29/05

Dissertation Topic: The Need for Multiculturally Competent Counselors Serving Welfare-to-Work

Students at West Los Angeles College

96 - OLIVIA YATES

Date of Final Oral: 7/5/05

Dissertation Topic: Sixty-six Years with Pepperdine: A

Biographical Study of Dr. Olaf Tegner

97 - NOKTEH TAHERI

Date of Final Oral: 7/6/05

Dissertation Topic: An Examination of Older Adults' Beliefs and Attitudes about Smoking and Smoking Cessation and their Perceptions and Expectations of the Role of the Physician in Smoking Cessation

98 - STEVEN WENTLAND

Date of Final Oral: 1/20/06

Dissertation Topic: Practical Guidelines for California's

Public School Teachers: Application and Understanding in How to Teach Religion for Instructional Planning and Lesson Presentation

99 - STEPHANIE RODRIGUEZ

Date of Final Oral: 6/02/06

Dissertation Topic: Career Paths of Female Presidents

in the California Community Colleges

100 - CLAUDETTE McLINN

Date of Final Oral: 6/12/06

Dissertation Topic: An Analysis of the Two African-American Women Presidents of the American Library Association: Demographics, Leadership Duties and Responsibilities, Leadership Styles, and Leadership

Pathways

101 - LEO MALLETTE

Date of Final Oral: 6/19/06

Dissertation Topic: Publishing Rates of Graduated Education Ph.D. and Ed.D. Students: A Longitudinal

Study of University of California Schools

102 - NANCY ROMO LUNA

Graduation date: 2007

The caregiver experience: A phenomenological study

103 - DIANE A. SMITH

Graduation date: 2007

Perceptions of trustworthiness: Direct-report perceptions of supervisor trustworthiness

104 - MARIE DIANE BUCK

Date of Final Oral: 5/29/07

Considerations for changing the approach to college-

level basic foreign language programs

105 - MARK LIEBERMAN

Graduation date: 2007

An electronic-based learning tool for strategy and

strategic thinking

106 - ROBERT M. SALLEY

Graduation date: 2008

Army leadership styles: Leadership style-to-Army

branch fit

107 - GARY ARTHUR GIBSON

Graduation date: 2008

A current study of the effects of language usage on

team deliverables

Appendix C

Chet McCall's Dissertation Advisor Genealogy

Product of Math Genealogy Project (http://genealogy.math.ndsu.nodak.edu/)

