

In Praise of Dr John Vincent Atanasoff, UF Class of 1925

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On my daily trek on campus, I am reminded of the athletic prowesses of our University, first by a large male alligator, and then by statues of UF's Heisman trophy winners; all are the objects of selfic adulation by past, present, and future students.

Indeed, in his inaugural speech President Fuchs acknowledged that “... *the national awareness of UF's excellence in athletics is sometimes stronger than awareness of our excellence in academics*”.

President Fuchs went on to “... *challenge us to think of a University of Florida that has the same acclaim in academics as athletics and that the nation looks to for leadership in both areas.*”

In answer to President Fuchs' challenge, I hope to witness someday a tangible recognition of the University of Florida's most illustrious alumnus, Dr. John Vincent Atanasoff, the “Man Who Invented The Computer”.

Instead of a statue, may I suggest the naming of an endowed chair, to highlight both the memory of its greatest alumnus, and the academic legacy of the University of Florida.

Who was John Vincent Atanasoff?

He was born in Hamilton, NY in 1903, the son of John Atanasoff, an émigré from Bulgaria, and of Iva, *née* Purdy, a descendant of early settlers in New York State. His father was offered a job by American Cyanamid as an electrical engineer, and the family moved to Polk County Florida.

He displayed early signs of brilliance: at nine he repaired faulty electrical circuits; at ten he took over his father's new slide rule, a handy device that handles multiplication by physically sliding a logarithmic scale past another. This led to a lifelong fascination with logarithms, and a study of mathematics encouraged by his mother who had herself studied College Algebra in High School.

He graduated in two years from Polk County's Mulberry High School. After a year as a phosphate prospector and mathematics teacher, he was admitted to the University of Florida in 1921, with the goal of learning theoretical physics.

There was no such program of study at the time, and he graduated four years later with the next best thing, a Bachelor of Sciences in Electrical Engineering (BSEE) with the highest GPA in the history of the University. The “Seminole”, UF's 1925 yearbook, records a John Vincent Atanasoff, nicknamed “*Pelican*”, as member of two honor societies and president of the Benton Engineering Society.

Upon graduation, he accepted Iowa State's offer to pursue his graduate studies, earning a masters degree in mathematics in 1926, having declined a later offer from Harvard.

He stayed in Ames and taught mathematics until March 1927, at which time he joined the graduate program in theoretical physics at the University of Wisconsin at Madison. He joined Professor J. H. Van Vleck's course on quantum mechanics in the middle of the second semester, and to the incredulity of the instructor, ended up best in this notoriously difficult and very new subject. In July 1930 he submitted his thesis on "The Dielectric Constant of Helium", and was awarded a Doctorate in Theoretical Physics under the supervision of the same Professor Van Vleck (himself a 1977 Nobel Laureate in Physics).

He returned to Iowa State where he survived the Great Depression as an Assistant Professor of Mathematics and Physics.

What did John Vincent Atanasoff do?

His thesis had dealt with the real world, full of complicated equations whose solutions defy analytical methods. Approximations were essential and the solutions required lengthy and repetitive calculations. "JV", as he was called, had then bemoaned the lack of such computational tools. Now, finished with his formal studies, and with security provided by early tenure, he set about thinking about designing such a computing device. He started by learning all about the computing machines on the market; all were mechanical, such as Vannevar Bush's Differential Analyzer. He knew what he wanted but could not put it together.

One very cold December night in 1937, utterly frustrated, he drove aimlessly in his Ford V8 at speeds of up to 90 miles an hour. He ended up in Illinois where he spotted a "honky-tonk" just beyond the Iowa border where he ordered a bourbon and water. Was it the bourbon, was it the exhilaration of speed, or happenstance, but all of a sudden the pieces started to come together. Over the next three hours he outlined in his mind the necessary elements an electronic digital computing machine should contain.

In so-doing, Atanasoff originated many of the ingredients found in today's computers, and is now widely regarded as the father of the digital electronic computer, a recognition long in coming.

Atanasoff's computer would

- not be mechanical, and use vacuum tubes (triodes),
- use zeros and ones (base two) to represent numbers,
- use capacitors for memory and invent a way to "jog" (refresh) the memory,
- compute by logic action rather than by enumeration.

These were revolutionary concepts to use in a computing machine. Except for the base two arithmetic he had come across as a child, he did not know how to design these various pieces; he just knew this was the way to do it. Thus

was born the first modern digital electronic computer in a honky-tonk at the Iowa-Illinois border.

In 1939, he enlisted a talented graduate student, Clifford Berry; together they built the Atanasoff-Berry Computer (“ABC”) in the basement of the physics building at Iowa State. It was the first digital electronic computer, albeit not “all-purpose”, since it was designed the specific task of solving many simultaneous linear equations.

At the meeting of the American Association for the Advancement of Science in December 1940 at Philadelphia, Atanasoff met John Mauchly, a kindred spirit physicist with an interest in designing new computing machines.

Atanasoff told Mauchly of the new features he was incorporating in ABC computer, binary arithmetic, logical electronic circuits, and a regenerative memory with capacitors. He invited Mauchly to come to Iowa to see for himself.

Mauchly and his son stayed at the Atanasoff’s in June 1941 for a four-day visit, and JV freely shared many of the secrets and challenges of the ABC computer, at the same time completing a patent application with the Iowa State lawyers for the Atanasoff-Berry Computer.

After Pearl Harbor, John Vincent joined the Naval Ordnance Laboratory in Washington, where he stayed for the duration of the war. Upon his return to Ames in 1946, he learned that Iowa State had not filed his patent application!

In the meantime, John Mauchly and J. Presper Eckert having designed ENIAC (Electronic Numerical Integrator And Computer), the first “multi-purpose” electronic digital computer, the at the University of Pennsylvania, claimed their role as the inventors of the modern computer.

Mauchly & Eckert and the Sperry Rand corporation filed a patent to that effect, claiming one billion dollars in royalty fees from Control Data and Honeywell. In the ensuing legal fight, the seminal innovations contained in the ABC computer came to the fore, and the patent was denied: there is no patent for the invention of the electronic computer.

John Vincent Atanasoff received many honors late in life, acknowledging his contributions to the design of modern computers. He died in 1995.



JOHN VINCENT ATANASOFF, "*Pelican*", Bradley Junction. Engineering B.S.E.E.

Sigma Tau, Phi Kappa Phi, Polk County Club, Benton Engineering Society, American Institute of Electrical Engineers, Vice-President B. E. S. (3), President (4), Debating Representative Engineering College (4).

GERALD H. BEE, "*Jerry*", Sebring. Arts and Science A.B.

Chi Delta, Alpha Phi Epsilon, Sigma Delta, Blue Key, Vice-President (4), Farr Literary Society, Secretary-Treasurer (2), Vice-President (3), John Marshall Debating Society, Sebring Club, President (3), Highlands County Club, President (4), Poets' Club, Self-Help Club, Soccer (2), 3, 4), Manager (3), Captain (4), College Cross Country Team (2), Editor-in-Chief of the Alligator (4), Managing Editor (3), President Florida Collegiate Press Association (4), Seminole Staff Literary Editor (2), President Junior Class (3), Varsity Triangular Debating Team (3), Inter-Society Debates (2), Band (2), President Junior Pan-Hellenic Council (4), Minor Sports Committee, Secretary (4).

I. C. BATCHELDER, "*Rusty*", St. Petersburg. Arts and Science A.B.S.S.

Kappa Sigma, Farr Literary Society, Commerce Club, Theta Ribbon Society, Pinellas County Club.

ROBERT E. BARFIELD, "*Bob*", Valdosta, Ga. Arts and Science A.B.

Lambda Chi Alpha, Farr Literary Society, Phi Kappa Literary Society (U. of Ga.), Editorial Staff Southern Drawl (U. of Ga.), Repertorial Staff of Red and Black (U. of Ga.).

Honors

- The Institute of Electrical and Electronic Engineers (IEEE) recognized Dr Atanasoff as a “Computer Pioneer for Having Designed the First Electronic Computer with serial memory”
- 1974 Honorary Degree of Doctor of Sciences from the University of Florida
- 1985 (Iowa) Governor’s Science Medal as inventor of the first electronic digital computer.
- 1985 Holley Medal by the American Society of Mechanical Engineers (ASME)
- 1987 Honorary Degree of Doctor of Sciences from the University of Wisconsin
- Foreign Member of the Bulgarian Academy of Sciences (1985)
- 1986 First Coors American Ingenuity Award
- 1990 Recipient of the “United States National Medal of Technology” from President George H. W. Bush

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