

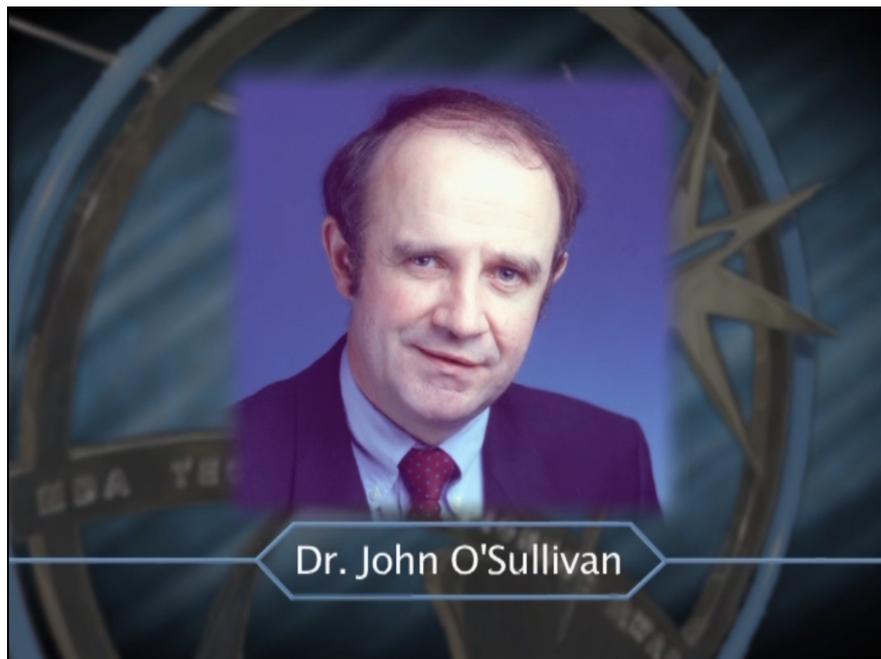
John J. O’Sullivan, 1948-2006
A career that remained under the radar

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ABSTRACT. A brief account is given of John O’Sullivan’s short but high-impact career. A link is provided to the video-recording of the ceremony at which he was posthumously granted the Pioneer Technology Award from the US Missile Defence Agency. The citations attest to his important technical and societal contributions.

The Terminal High Altitude Area Defense (THAAD) anti-ballistic missile defense system was developed by the USA and is now in use in Hawaii, the Middle East and South Korea. The THAAD interceptor system does not carry a warhead; its kinetic energy of impact destroys the incoming missile, and minimizes the risk of exploding conventional missiles, or detonating nuclear tipped ones.

A UCC-educated academic-turned-scientist played a central rôle — until now unknown to his peers — in developing the THAAD system.



John J. O’Sullivan was one of 13 children of a gardener who worked at Garnish Island, Glengarriff, West Cork. He was born in 1948. After receiving his PhD in the USA, he did a stint as an academic, but switched to defence work in the Washington DC area at age 32. He died at age 58 in 2006, two years before the Terminal High Altitude Area Defense system was first deployed.

Because of the under-the-radar nature of his work, conventional measures of John’s ‘footprint’ do not apply. This note is meant to make his impact better known, and

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(belatedly, with the help of today's information technology) to celebrate his far-too-short life.

John obtained his secondary education at St Augustine's College, Dungarvan, and won a Cork county-council scholarship to UCC in 1965. There, he quickly left the rest of us in the science programme in the dust: in the first year, he was one of just 12 students allowed into Professor Fahy's honours physics class, and he quickly caught the attention of Professors Paddy Barry, Finbarr Holland and Siobhán O'Shea in mathematics, and Professor Paddy Quinlan in mathematical physics. John earned his BSc in 1968 and his MSc in 1969.

In 1969, John won an NUI Travelling Studentship Prize, which paid for one year abroad. He used this, and a funding package he had already secured, to pursue a PhD in mathematics at the University of Notre Dame.

I do not remember why he took this one offer over the many other attractive offers he had. For our three undergraduate years, both John and I were lodged in the Honan Hostel at UCC; Professor Seán Teegan was the Warden. I do remember that Teegan — who had held a research fellowship at Notre Dame — invited John (and me because I was also considering post-graduate studies in North America) to watch travel-slides from his year at Notre Dame.

John earned his PhD in mathematics in 1973 and did post-doctoral work at the Institute for Advanced Studies in Princeton, and at Bonn University before taking up an academic position in the department of mathematics at Penn State in 1976. His academic research ([1, 2, 3, 4, 5] are examples) focused on differential geometry.

I was best man at his wedding in South Bend, Indiana and kept in contact with him while I was working in Buffalo and Boston. I visited him in Princeton and at State College, but lost contact with him after I moved back to Canada in 1980.

I was not surprized that John moved to applied work in the US defence domain. In an early project he led the mathematical modeling effort and was a key member of the software design team that developed the enlisted manpower forecasting system for the US Army. Later he managed the strategic defense technology division at another not-for-profit corporation, before joining the also not-for-profit Aerospace Corporation in 1989.

He did visit my family and me once in Montreal in the 1990s. But he tended to stay off-the-grid and under the radar. Unfortunately, the next I heard of him was in 2006, when I got a phone call from his brother (and godchild) Denis, who told me the sad news of John's untimely death.

How he died is ironic, and a reminder that in 2006, and even more so in 2019-2021, enemies can so easily penetrate our own personal defense systems, some of them even aided by our current medical environment. While leaving his office in the Pentagon, John spotted a colleague who was to give a briefing on Missile Defence the following week; John wanted to advise him on one or two things. In turning to brief his colleague, John twisted his ankle. The following morning his ankle had swollen to the extent that he could barely put on his shoe. He went to a hospital, where he was x-rayed, given crutches and painkillers, and sent home. That evening, he worked late into the night on a presentation he was giving the following day. During the night his partner Elaine went to check on him as he hadn't come to bed. She found him at his desk, unresponsive. He was rushed to hospital where he subsequently died. The post mortem examination revealed that John had contracted a Methicillin-resistant *Staphylococcus aureus* (MRSA) infection while attending that hospital: the bacteria had entered his body via a bullous blister on his sprained shin or ankle. John had never been out of work sick a single day in his life, and his family had often heard him say that his name was never on a prescription.

John's funeral was accorded the highest military honour that a civilian can receive in the USA. It was attended by the highest ranking members of the USA Army and Air Force. Also in attendance were many senior politicians from Congress. In a gesture accorded to very few, the American flag was flown at half mast on both the Pentagon and on Capital Hill during his funeral service. One of these flags now takes pride of place in his brother Denis' home in Midleton, Co. Cork.

At a 2007 meeting where several of John's American and Irish family were the guests of the Agency, John was posthumously given the Pioneer Technology Award from the US Missile Defence Agency.

The video-recording of the proceedings, prepared by the Agency, can now be viewed at <http://www.biostat.mcgill.ca/hanley/JohnOSullivanPioneerTechnologyAward2007.mp4>. The portion concerning John begins about six minutes in.

A two-minute video was played just before the award was presented by Lieutenant Obering, Director of the US Missile Defence Agency. It tells how, as one of the first members of the Phase One Engineering Team, John's technical expertise was recognized and respected. John later served as the director of the team, exhibiting superior leadership in his oversight of numerous activities focused on the resolution of high priority missile defense issues. The video narrative continues:

Dr O'Sullivan's signature contribution to the development of missile defense technology, however, was his remarkable work on the Terminal High Altitude Area Defense program. He led the study that first identified the need for an upper-tier missile defense capability to support the PATRIOT system in defending U.S. deployed forces. He later established the framework for the development of the Terminal High Altitude Area Defense program and directed the engineering team support for the program office. He led the effort to identify and assess existing technologies that would provide the program with the capability to intercept missiles both inside and outside the earth's atmosphere. He also served as the chief technical advisor in the process of selecting the prime contractor for the program and was instrumental in the program's transition from research and development to testing.

Dr O'Sullivan's tireless commitment to the Terminal High Altitude Area Defense program in particular, and his selfless dedication to the Phase One Engineering Team in general, have been essential to the development of a missile defense capability for the United States. His legacy lives on in the technologies that are now ensuring the safety and security of our nation.

Brigadier General Patrick O'Reilly, at the time Deputy Director, and later Director of the US Missile Defence Agency, prefaced the video with his own words, in which he spoke about John's 'sheer brilliance' in the missile defense technology, and how he was able to relate so well to people of all levels:

That was a period of time where it was easy to get a room of this size of PhDs (> 200) to talk to you *ad nauseam* about why it wouldn't work. John was so brilliant he could answer their questions, and would adapt his answers to the audience he was talking to. He could base his answers on layman's terms, on linear terms, calculus-base answers, or tensor algebra. [...] In the 18 years I had the pleasure to work with him, I didn't ever see him not come back with an answer that required the smartest minds in our country who were saying it couldn't be done, and John was saying it could, and he was proved ultimately right over and over again.

Brigadier O'Reilly referred specifically to:

the studies John did in the late 1980s, even before the Gulf War, on whether or not you could fly a space-designed missile system in the atmosphere. He was the one who truly saw, based on mathematical calculations, not just feelings

or intuition, how the system could work, both in the ‘endo’ atmosphere (at an altitude below 100 Km) and the ‘exo’ atmosphere.

He also described how John was a pioneer in ‘seeing the need for a cadre and generation of missile defense experts,’ and how he spent ‘countless hours’ mentoring them.

At the opening of its new facilities in Huntsville, Alabama in 2008, Aerospace paid tribute to this ‘legendary figure in ballistic missile defense’ [6, page 53], naming the conference room in John’s honour.

In his incoming interview with the Irish Examiner in 2017, the UCC President — a physicist who also contributed to work on the USA defence system, and who also has strong links to Glengarriff in West Cork — spoke of the Irish imagination and attitude. It is these that lead to our reputation ‘as poets and raconteurs’ but they can also ‘add value to those in the fields of science, technology, engineering and mathematics.’ The glowing testimonials from the ‘top brass’ in the US defence department are not limited to John’s technical talents, but also his leadership, integrity and communication skills.

John’s career has points in common with that of another USA-based but Irish-educated teacher-turned-inventor from a century earlier. John Philip Holland was born in the coastguard’s residence in Liscannor, Co. Clare in 1841, finished his formal education at 13, and began thinking about submarines at age 17 when he began teaching at the North Monastery CBS in Cork. He quit teaching at age 32, and moved to the USA. He lived to age 73 and saw his submarine system through to its implementation and adoption by the US Navy.

As evidenced by Holland and O’Sullivan, the Irish imagination is perhaps even stronger in those who spent their youth close to the coastline, and had the time to contemplate both the oceans and the heavens. Such people not only dream big, they make Ireland punch well above its weight.

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