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PHYSICS & SOCIETY

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From the Editor

Oriol T Valls is a theoretical Condensed Matter physicist at the University of Minnesota

Things continue to be relatively quiet in my mailbox, despite all that is going on in "Physics and Society" at large. Maybe things are calming down? There are some positive signs: our new batch of foreign graduate students arrived here, all having obtained their visas .

Besides a number of news items (we are after all a newsletter) we have several articles in this issue. One is by the current Forum chair, who has had a long and interesting life working on many aspects of Physics and Society. Another article is reproduced (at their request) from an American Institute of Physics web site.

And also we have two book reviews, one of which is very scary.

The contents of this newsletter are basically reader driven. All topics related to Physics and Society are welcome, excluding only undiluted politics and anything containing invective, particularly of the ad hominem variety. Strong opinionated language is however quite all right. Manuscripts should be sent to me, preferably in .docx format, except Book Reviews which should be sent directly to book reviews editor Quinn Campagna qcampagn@go.olemiss.edu. Readers are invited to submit a review of any pertinent book. It can be a book of their choice or one sent on request by Quinn. Quinn maintains a list of volunteers that make themselves available to review. Besides the pleasure of serving our community, you will get a free book to keep.

The contents are **not peer reviewed (I do read them before acceptance of course) and opinions given are the author's only, not necessarily mine, nor the Forum's nor, a fortiori, the APS's either**. But subject to the mild restrictions mentioned above no **pertinent subject needs to be avoided on the grounds that it might be controversial. On the contrary, controversy is welcome.**

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IN THIS ISSUE

AIP Initiative

The American Institute of Physics, has launched a new initiative to preserve the human stories behind today's dramatic shifts in science policy and funding.

As job losses, project terminations, and other changes ripple across the physical science enterprise, AIP's Niels Bohr Library and Archives is collecting first-person accounts from those affected—scientists, engineers, students, staff and others whose careers and communities are being impacted.

Anyone interested in participating can take 10-20 minutes to fill out a short open ended set of questions in a web form. Those stories—shared anonymously or with attribution—can help ensure people today, and in future generations, understand not just what has changed, but what it felt like to experience these changes.

More context on this initiative here and how you can get involved here https://lnkd.in/eR3VSfBY

Please help us get the word out about this initiative. Every story shared will strengthen this collective record.

Ajp Special Issue

The American Journal of Physics (ajp.aapt.org) invites submissions for a special issue, "Motivating physics learning through research applications," with a submission deadline of December 31, 2025. This issue will share how concepts from undergraduate physics are applied in research, with the goal of providing instructors with examples to motivate students to learn the topics that are already included in our curriculum. Papers in this issue won't explain entire research problems, but, rather, will share examples from the research process that illustrate the use of specific topics in undergraduate physics. You might think about what concepts are most important for new students in your lab to understand, or what process you love to explain to new students because they recognize its connection to what they learned in class. For more information, see the call for papers, https://doi.org/10.1119/5.0282126, or contact the editor, Beth Parks, meparks@colgate.edu.

Physics and Society is the non-peer-reviewed quarterly newsletter of the Forum on Physics and Society, a division of the American Physical Society. It presents letters, commentary, book reviews and articles on the relations of physics and the physics community to government and society. It also carries news of the Forum and provides a medium for Forum members to exchange ideas. ***Opinions expressed are those of the authors alone and do not necessarily reflect the views of the APS or of the Forum. Articles are not peer reviewed.*** Contributed articles, letters (500 words), commentary, reviews and brief news articles are welcome. Send them to the relevant editor by e-mail (preferred) or regular mail.

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***Physics and Society* can be found on the web at** aps.org/units/fps.

FPS Sponsored Sessions At Upcoming March/April (Physics Summit) Meeting

This is a tentative schedule. It will be updated at the next issue.

March (2 sessions):

Session 1: This is the session containing the Burton Award (not yet determined) and (in collaboration with FECS) featuring young people doing FPS-style work. The session title will be something like "Using Physics to Help Society."

Tom Looby
(Commonwealth Fusion, Commercial fusion energy)

Rosimar Rios-Berrios
(NSF, Atmosphere modelling)

Savannah Thais
(Columbia, Building trustworthy AI)

Martin Vögele
(Schrödinger, Inc. Physics to accelerate drug discovery)

Sébastien Philippe
(Princeton University)

[All confirmed except Philippe. Chairs: Lincoln [FPS] and Daniel Marx [FECS]]

Session 2: "Artificial Intelligence and Quantum Computing."

Carleton Coffrin
(LANL, Overview of QC)

Robert J. Ledoux
(Quantum New Mex. Inst., Quantum computers in energy sector)

Stephon Alexander
(Brown, Reimagining the Universe?)

Thomas Searles
(U. Illinois, Chicago, Quantum materials, with AI and secure systems)

Jorge Gonzalez-Cruz
(SUNY, Albany, Using AI to model energy in sustainable cities)

[All confirmed except Alexander. Chairs: Gardner and Harvey]

April (2 sessions)

Session 1: Combatting mis/disinformation in modern media

Laura Lindenfeld
(Director, Alan Alda Center for Communicating Science)

Brandon Specktor
(Physics editor, Livescience)

Jeanna Brynner
(Managing editor, Scientific American)

[All confirmed except Brynner Chair: Lincoln)

Session 2: Missile defense

Laura Grego
(UCS, Midcourse Missile Intercept and Broad Implications)

Fred Lamb
(UIUC, Space-Based Intercept and Broader Questions)

Aaron Bateman
(GWU, History of Missile Defense Programs and Consequences)\

[All confirmed. Chair: Ramana]

Online Repositories for University Course Lectures

Presenting lectures to university students in classrooms should be obsolete. Professors should record lectures and make them available online so students can watch them at their convenience.

Hyperlinks to the lectures could be provided on a course webpage on the university website. The lectures could be available on the university website, YouTube, or another video sharing website.

The best professors for teaching different subjects could become well known. The best lectures on particular topics in different languages could be watched around the world permanently.

People around the world who can't afford to take university courses, who are prohibited by repressive governments from taking courses, or who want to enhance their knowledge of particular topics will be able to watch the lectures.

Like a university professor usually gets students to read textbooks written by other people, a university professor teaching a graduate or undergraduate course could tell students to watch online lectures by one or more other professors at the same university or one or more other universities to learn about particular topics. If lectures are available online, multiple professors at a university won't have to teach the same material.

Physicist Richard Feynman was renowned not only for his research contributions that led to a Nobel Prize, but for his ability in teaching. He was called "the great explainer." Feynman, Robert Leighton, and Matthew Sands created a three-volume set of books known as The Feynman Lectures on Physics based on Feynman's lectures. There are video recordings of 7 of his lectures and audio recordings of 122 of his lectures on the website for the California Institute of Technology (Caltech) at URL https://www.feynmanlectures.caltech.edu/.

Imagine if there were video recordings of all of Feynman's lectures. Would physics students around the world watch his lectures? How many other great explainers are there in the world who never become well-known beyond their universities because their lectures aren't recorded and made available online? How many great explainers had their lectures perish when they perished?

Most professors spend a lot of time on research and writing research papers that are reviewed by other researchers and published in journals, conference proceedings books, and books to disseminate the research. Professors list these reviewed publications in their publication lists and curricula vitae. Publications that weren't reviewed like blog posts and technical reports lack credibility and shouldn't be added to publication lists and curricula vitae.

Online course lectures created by a professor could be reviewed by another professor at her university and published in an online repository of lectures to allow anyone to watch reviewed course lectures. Getting the online course lectures reviewed by another professor is good for increasing the quality of the lectures and critical for the credibility of adding the lectures to a publication list and curriculum vitae.

Then professors could add these reviewed publications to their publication lists and curricula vitae too. This would significantly enhance their publication lists and curricula vitae.

The advantages of online lectures for professors are the online lectures will save them time, prevent them from needing to teach the same course material every year, allow them to spend more time on research instead of teaching, allow people around the world to permanently access the lectures, prevent multiple professors from needing to prepare and deliver lectures for the same course, increase the number of publications in their publication lists, etc. The disadvantage of online lectures for professors is they might need to spend more time initially to prepare online lectures.

The advantages of online lectures for students are they can rewind the lectures if they want to watch something again, they won't miss lectures due to illnesses or other reasons, they can watch the lectures at the most convenient times for them, they can even watch the lectures in advance of taking the courses to work ahead, they can watch the best available lectures from around the world, they can see if courses interest them before taking them, they can watch the lectures without taking courses for credit, etc. The disadvantage of online lectures for students is they can't ask questions during the lectures, but they can still ask questions to professors or teaching assistants after the lectures.

The advantages of online lectures for universities are they will not need to spend as much money on paying professors to teach the same lectures repeatedly, their professors will be able to get more research done, they will be able to offer degrees to students around the world, etc.

In my opinion, the advantages outweigh the disadvantages for professors, students, and universities. Online repositories for university course lectures will significantly improve university education.

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Flavors

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Editor's note: This article is an expanded version of a Banquet talk entitled "Flavors" given by that author at the APS NW Sectional meeting held at the University of Calgary June 27. 2025.

Let me start with the fact I was born in 1946 at Freedmen's Hospital in Washington DC origi-nally on the grounds of Camp Baker (a Civil War Union safe haven for the escaped enslaved) and becoming the Howard University campus in 1868 in Washington DC. My father was Phi Betta Kappa and a three year football letterman in college; my mother was in the first round of Head Start teachers; and my brother and I were two of the first Black Eagle Scouts in the National Capital (Washington) Area Boy Scouts of America Council. I lived within the segre-gated Washington DC Black community until completing my BS degree in Math with physics minor. Key mentors were Dr Walter Talbot and Dr Robert M. Dixon at Morgan State University. Before Morgan, I had attended Lincoln University in Missouri, dropping out after my sophomore year.

The summer before I entered physics grad school in 1968 at The College of William & Mary, I worked for Prof O.M. Phillips in fluid mechanics at Johns Hopkins. There I met Professor Stan-ley Corrsin who gifted me his second edition copy of Relativity by Albert Einstein. Earning a MS in physics with emphasis in Plasma Physics experimentation (that produced my first APS abstract) was challenging because I also became the founding president of the William & Mary's Black Students Organization. However not passing my first PhD Qualifying Exam, I dropped out, went back to the DC area, taught math at Bowie State College. After spending one night at anchor on a dear friend's family cruising sail boat, I set out to learn to sail at the Washington Sailing Marina in Alexandria Virginia. Supported by my entire sailing club, I was the first Black American to race in a regatta at the segregated and very reluctant Tampa Bay Yacht Club.

My love for physics, however, propelled me to contact William & Mary to see if it were possi-ble to return to pursue the PhD. The then chair, Rolf Winter, told me they were hoping I would return and they had kept my full ride fellowship available. Once again it was off to Williams-burg - this time taking my 15 ft day sailor/racer with me. I passed the Qualifying Exam and started working with Professor Franz Gross on relativistic nuclear/intermediate energy physics. During that time, I met visiting Professor Chris Fronsdal, of UCLA, who had a formulation of the Bethe-Salpeter equation different from Franz's version; AND Chris was an experienced ocean sailor.

In 1974, as I worked to solve the fully relativistic (special theory) Gross equation for the deu-teron of which the pion was considered, at that time, to be the mediator of the Nuclear Force between the neutron and proton that were the components of the deuteron, I took a break and met Chris Fronsdal in Nassau Bahamas. He had just closed the Atlantic on his 40 ft sailing trimaran. That was my first time in the gorgeous Bahama archipelago and my first ride on a trimaran. I was excited to take an overnight open water passage from Nassau to the Great Abaco chain of islands, to the north. There, in Little Harbour, I met really good friends, Ron and Jean Chapman, who taught me about boat building and living on a remote tropical island.

I did manage to solve the coupled channel deuteron problem, for my PhD, and showed that the hard core was not hard at all but offered different short range physics; relativistic effects and, later, quark effects. This finding marked a transition of nuclear physics to intermediate nucle-ar physics, as many of us would call it.

My postdoc was at Stony Brook, in Gerry Brown's Group. There I researched nucleon-antinucleon interactions employing meson theory, that was so successful at describing NN in-teractions, along with Carl Dover and Jean-Marc Richard. That work predicted a plethora of quasi bound states. To also spend time on the nearby Long Island Sound and stretching my re-sources, I bought a 22 ft sailboat to cruise Long Island Sound. Known for long passages, one year later I received a loan to buy a 31 ft trimaran named Shadowfax, a Jim Brown Searunner built by Chris White; and sailed her with a crew of three from North River (at Jim Brown's dock) off Chesapeake Bay to western Long Island. I then sailed her solo to Mt Sinai Long Island where she was to be moored. Sailing her to Martha's Vineyard one summer, meeting famous yacht designers and world sailors, showed how comfortable Shadowfax really was. Also, I learned to paint watercolor under the gentle encouragement of Stony Brook Professor Nandor Balazs. It was at Stony Brook that I began to learn about quark physics from the MIT Bag Model, mentored by William & Mary mentor Professor Carl Carlson. My intermediate w in-termediate-energy nuclear was starting to attract high energy/particle physics elements.

Leaving Stony Brook after a 3- year term, I landed a staff-researcher job with the University of Paris' laboratory in Orsay The long distance from Shadowfax and the dearth of nucleon-antinucleon experimental data was disappointing as the huge annihilation cross section washed out any possibility of detecting predicted quasi bound states. I hope perhaps new ex-perimental techniques can still be developed. Yet, in 1980, it gave an opportunity

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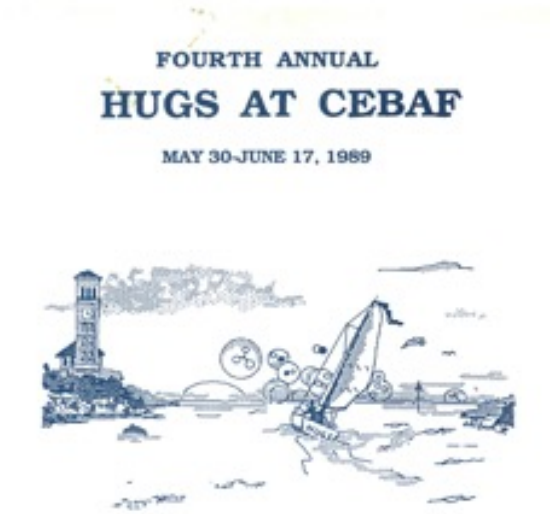
to request and be granted a five month leave, without pay, to rejoin Shadowfax on Long Island and sail her again to Martha's Vineyard to supply up for a sail to The Bahamas. Five months and quit-ting my job turned into three years of learning cruising sailing; being partially sustained by selling watercolors to boaters and tourists and by learning to spearfish while free diving. Dur-ing that time, with help from friends, I developed oil painting techniques while SCUBA diving on the sea floor. And, yes, Shadowfax got caught on a windward shore facing hurricane force winds and being greatly damaged. After two of us repaired her on a Bahamian beach, we sailed her back safely to the USA across 4 days of open water. Whew!

While in the Bahamas, in 1983, I received a letter from Franz Gross, in his wisdom, urging me, in his wisdom, to return to help build a new proposed new electron accelerator for the US De-partment of Energy in Newport News Virginia - only a short drive from William & Mary. Iden-tified, at that time with the cumbersome named, Continuous Electron Accelerator Facility (shortened to CEBAF), after construction completion, became the heart of the Jefferson Lab or JLab. While sailing I had met a lot of folks who had no idea about the beauty of physics or even what it is; and this opportunity to help tell the story of physics while participating in building a new lab was intriguing; so, to the Virginia Peninsula the small crew of Shadowfax steered.

Upon arriving at Chesapeake Bay, I landed a tenure-line professor position at Hampton Univer-sity, a private historically Black university located on the historic Hampton River where Shad-owfax could dock. There I could help introduce nuclear and high energy physics to bright stu-dents, allowing them to contribute to the rare building of a world class accelerator lab from its naissance. I was the sole nuclear/high energy prof there among the four senior faculty.

Right off the bat, I was fortunate to be awarded a grant from NASA to calculate space radia-tion effects; focusing on antinuclear cosmic rays. Then it came to mind to create an interna-tional summer program to attract attention to Hampton as a member of SURA - the South-east Universities Research Association - that managed CEBAF/JLab. This came in the form of HUGS (Hampton University Graduate Studies) at CEBAF which was launched by successfully being awarded $4,000, jointly, from the cities of Newport News and Hampton, to me as PI. I also created all the original art designs for the HUGS T-shirt advertisements for the first 10 years of its running. Neither NSF nor DOE would make an award because there was no "track record." But after the first year, both agencies reached out to request a proposal. The collec-tive wisdom from my colleagues and allies was to accept the DOE proposal invitation. HUGS has continued under DOE funding since 1986. One of HUGS' biggest supporters was then CE-BAF's, the Scientific Assistant to the Director, Bev Hartline, who is now Councilor for APS fora FPS and FDI. In those early years, Bev arranged for CEBAF Director to take all the HUGS stu-dents out to "Lunch with the Director." HUGS is now, my understanding, the oldest continually operating summer "school" specifically for nuclear physics graduate students in the World. Since its inception it welcomed all early graduate students; and particularly recruited students from campuses with limited to no nuclear physics research available, providing a path for many more students to enrich their physics preparation.

At that time, Hampton had only an undergrad and small masters program in physics. The ex-pected research to be conducted at JLab was best performed by university and lab



researchers with PhD students. This motivation drove me to establish a PhD degree program offering at Hampton; and the Hampton administration agreed. It would be the first PhD that Hampton offered. While working with NASA, I was also fortunate to be awarded an NSF grant to devel-op a nuclear physics group that, in actuality consisted of me and one postdoc. This NSF grant together with the clear recognition that JLab was real and historically excluded folks could make an impact was compelling. I also led Hampton in the partnering with JLab to create four joint faculty appointments under an MOU signed by JLab director, Hermann Grunder, and Hampton University President, William Harvey. So, I prepared a proposal to NSF for a re-search center of excellence (unprecedented at a minority serving institution in nuclear and high energy physics). The plan required focused partnering with newly hired faculty under the MOU, JLab staff and others contributing in suggestions and support . The first faculty member hired under the MOU was Keith Baker (presently professor at Yale University) whose PhD work was in low energy nuclear physics and who was considering dropping out of physics when I met him at Duke University.

Hampton obtained full accreditation to offer the PhD degree; and received, with me as PI, a $10 million ($1 million per year) cooperative agreement with NSF to create the Nuclear/

High Energy Physics (NuHEP)Research Center of Excellence in 1992, a few years before JLab had its first beam. My faculty colleague on the PhD accreditation pursuit and Department Chair, De-metrius Venable, also won a similar large Center award from NASA. These two awards bol-stered our new PhD offering tremendously!

The NuHEP Center, I directed, leveraged the additional joint faculty hiring of Liguang Tang, Cynthia Keppel and Jose

NuHEP PAC Meet-ing 1997-8

Goity. Under NSF rules of the agreement, the Chairperson of the Center was the Hampton University President; also we established an external group named the Planning and Advisory Committee (PAC) of which I asked Jim Gates (University of Maryland) to chair and he agreed. It didn't hurt that Jerry Friedman (MIT) and other very notables were on the PAC offering strategic advice. My charge to the PAC was, "If we are not performing world class physics, then advise us how to do so. If we are performing world class physics, tell eve-ryone." The PAC offered no substantive corrections. At steady state, the Center had a mem-bership of about 30 that included faculty, post docs, graduate students, undergraduates and staff. Hampton University renovated a building to house both NuHEP and the NASA laser Cen-ter. Then the national average for graduating Black American physics PhDs was 0.5 per year; the department started graduating 2-3 per year. By 1997, NuHEP hosted nine JLab fully ap-proved experiments, two had already run, along with experiments at NIKHEF (in the Nether-lands), Brookhaven National Lab, and MIT/Bates. Also, two NuHEP faculty won Early Career grants (Goity and Keppel) and another (Baker) with a Frontiers Grant. Keeping the Center a Center while, at the same time, encouraging initiative and creativity was my growth-management model. My theoretical work was focused on Kaon electromagnetic and electro-weak form factors. In addition, I appeared on the Bill Nye The Science Guy show as a "Way Cool Scientist" in the Season 5 "Atoms and Molecules" episode in 1998. that reached many thousands of young people. It was a seriously exciting time!

In reference to starting NuHEP, I feel enormous gratitude for two relationships in particular. The first is with Ben Zeidman (deceased) with whom I shared a library carrel "office" in the very early stages, before HUGS. We engaged in rich-enthusiastic discussions around Hampton focusing on strangeness thru ee'k experiments. The second is with Roger Carlini, the first Hall C Leader, who committed strongly to support Hampton experimentalists researching in Hall C, through the MOU. Hall C is where the new arena of ee'k experiments were being encouraged. In addition to being encouraged by senior NSF officials, these physics relationships were key in the creation of NuHEP.

But the ceiling started to show. In 1998 I gave an invited talk at a workshop at University of Washington's Institute for Theoretical Physics (INT) on my work on strangeness.

During that visit, I ran into friends Mark McDermott, former Department Chair at Washington, and his wife Lillian McDermott, the renowned physics education researcher; both now de-ceased. I had known them for years. They had no idea I was visiting INT and Lillian wanted me to give a second talk on what I called the Hampton Experiment of which NuHEP was a part. I did so; and in the audience was an associate dean in the Graduate Dean's Office who gave me a tour of the Seattle campus that ended up in the Dean's office. There were others in the room and the Dean and her husband were sailors; by chance I had sailed that very make of boat they owned and so we rambled on about sailing. Suddenly, she got a very serious face and told me that I was perfect for the job. My reply was "What job?" The next moment, I discovered she was the chair of the search committee for the founding chancellor of the Bothell campus just under construction and she thought I would be the perfect fit. This all caught me without a rudder! Even though it offered a unique opportunity to build a new cam-pus for the University of Washington with an extraordinary physics department near by, I real-ized Lillian and Mark had set me up. For the next several days, I talked with many about this new campus including the Dean once again.

When I returned to Hampton, I became convinced I would make an official application for the Bothell job; after all, there was the Puget Sound/Salish Sea to explore. NuHEP was running very well with approximately $3.5 million annual budget in the hands of Program Manager Vevelyn Nazario and Thia Keppel (presently Associate Director for Experimental Programs at JLab) agreed to be Interim Director. So, I met with senior NuHEP members to share that I was excited by the unique chance to build a new university to reach more students.

The search process for the UW Bothell chancellor position concluded with me landing the po-sition; and my 15 years at Hampton ended. On July 1, 1999 I became Dean and Chancellor of a campus that occupied a building and a half in a business park; and which had a permanent campus in the early stages of construction. My task was to complete the establishment of the permanent campus, maintain and grow academic programs of the quality expected of UW quality in solely upper division curricula and a couple of master's degree offerings. As I hired

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the first Vice Chancellor for Academic Affairs on my first day, the title of Dean was eventually dropped. I inherited a Citizens Advisory Committee (CAC) consisting of folks giving valuable strategic, non fiduciary, advice. I soon led the group to rename itself the Chancellor's Advisory Board. We now consider members of the CAC as our Founders.

The permanent campus was sighted on ranch land that was to be converted. Not only did my administration complete the initial construction of the permanent campus in Bothell including a public bus line campus stop; but did so on time and slightly under budget. The campus re-ceived award recognition from Washington State for that achievement. A mandated compo-nent of the construction was recovering a fresh water wetlands that the ranch land had tram-pled. Thousands of indigenous trees and plants were planted after removing invasive species; and a portion of the North Creek had been straightened to move timber across the land, to the Sammamish River connected to Lake Washington for commerce. The contractor we hired to perform this wetland recovery found the old creek bed, dug it out, placed new bedrock to ac-cept the flow of water again. I was there the moment the new creek bed began taking the flow of the North Creek water. A fun day!

Later, the creek was certified to be salmon-safe and salmon were seen spawning there once again. That gave warmth to my Eagle Boy Scout values and Buddhist sense of balance and well being.

We were also charged with co-locating with the State's newest community college and writ-ing the initial co-location documents for the community college students and faculty to use the University of Washington Library, to receive maintenance and security benefits from Uni-versity of Washington Bothell and so forth. With respect to security, we partnered with the Bothell City Police so that our security team would not carry weapons as we requested.

To develop close relations with the local community (City of Bothell and Snohomish County), local and State elected officials, and friends of the campus, I served on several Chamber of Commerce boards, gave talks at Rotary Club meetings, served on the board of United Way of Seattle and led the Children's Initiative of the Snohomish United Way and other organizations.

The rationale of the co-location was the community college would effectively serve as the lower division component of the campus' while UW Bothell would be the upper division. There would be community college students transferring to UW Bothell etc. Yet, that expecta-tion was not working well as the predominant group of transfer students came from other community colleges. That circumstance and the results of a Needs Assessment gave us rea-son to seek State authority for full 4 year status. We were not alone. UW Tacoma, the other new campus of the University of Washington and the three similar campus of Washington State University were also seeking 4 year status. Not only that but many of the State's com-munity colleges wanted to award "upside down" degrees that made them an effective 4 year.

Helen Sommers, then Chair of the Appropriations Committee, introduced a bill to have the House discuss how to proceed. While the session was stormy, the outcome gave us 4 year status and some of the community colleges could remove the title of community. Our co-located community college was one that removed the title of community. Higher Education institutions in Washington State are operating better without the concern of what class of students can be served. I regret not having the opportunity to profusely thank Rep Sommers for her creative solution that expended not only UW Bothell's ability to serve but also every other state college/university to do the same.

Another big project was designing and constructing a second entry or egress to the campus. That project involved the higher education construction budget as well as the transportation budget. It was complex, yet we managed to complete that construction phase the year after I stepped down as Chancellor.

I went over to the Seattle campus for two years to teach physics again with the intent to go back to UW Bothell to start a physics curriculum there. My first intro physics course at UW Bothell had 5 students registered. By the end of the second quarter, there were three stu-dents. It did not look hopeful; though I requested the administration to give me a second year offering the same course. This time, there were 20 students. The upshot of this, is that we very quickly hired a lecturer and offered sections! The new chancellor saw the need to offer science and technology at UW Bothell where only environmental sciences and Computer and Software Systems (CSS) were offered. So, I was asked to be founding director of a Science and Technology Program (S&T) that had to be developed! I welcomed the challenge to give more science and technology students opportunities to pursue their curiosity and passions. There were three of us as founding faculty of S&T; two chemists and me.

We started out pursuing an ABET-accredited electrical engineering major using UW Seattle as leverage. Those of you who know the accreditation process in engineering understand the steps we had to take; hiring faculty to create and teach courses to demonstrate accreditation criteria are being met. Also dovetailing was computer and software systems (CSS) that al-ready existed but in its very own Program. A way was found to incorporate CSS into the new S&T Program. Biology that required a research bench lab be built; that was accomplished. Then came math, chemistry, mechanical engineering; and then, finally, we developed a physics major. One of the first faculty hired, Joey Key, to get the physics major going is an early mem-ber of the LIGO Collaboration. During this period, I served on the board of the Pacific Science Center, located in Seattle, and chaired their Science Education Advisory

Committee; and I served as founding board member of King County Cultural Development Authority (4Culture).

The UW Bothell was still under Program curricula; as there was a clear conflict with titles of Program Directors at UW Bothell and Deans at UW Seattle. Just as S&T was starting to get a stride, the UW Regents gave authority to evolve UW

University of Washington Bothell

Bothell and Tacoma Programs into Schools. In 2016, three years after we became the School of STEM, I retired. The School of STEM is now the largest of the five Schools on a campus serving approximately 6,000 students total. The campus today with 1,000 dorm beds and about 60% students of color - is perhaps the most naturally diverse campus in the Pacific Northwest.

I had the benefit of UW Bothell having had a line of great leaders from its inception in 1989 before me and following me. I also had a great team in my administration! What an extraor-dinary experience it has been capped off with meeting my incredible wife, Cate, there.

Speaking of Cate, she and I were on our cutter-rigged sailboat docked in Puget Sound prepar-ing for another cruise to the San Juan Islands when I received a call from the Governor of Vir-ginia telling me he wanted to appoint me to the Board of Visitors of The College of William & Mary. It was a memorable discussion with the Governor. I agreed.

This William & Mary Board, I served on, hired its first woman as president, who is still in-stalled, since the venerable institution's founding in 1693. Without a Medical School or an En-gineering School, William & Mary just established the new School of Computing, Data Scienc-es and Physics. This should fit well with the JLab and BNL data center and eventual operation of the Electron-Ion Collider collaboration.

Missing our four grandchildren, my wife and I settled solely in the PNW to be closer to them and their parents (our second son and his wife; and only daughter and her husband) while at the same time visiting with oldest son in Chicago and youngest son and wife in Vermont. Four adult children and four grandchildren.

My physics work also included culminating pion and kaon physics results that I find intriguing; but do not quite yet require sophisticated high computing power. Many researchers have stud-ied the elastic charge and electroweak sector of QCD; and my work with my collaborators be-gan with the pion elastic charge form factor that has resulted in publishing several calculated elastic and electroweak kaon form factor results as well. In the work on electroweak kaon form factors with Andrei Afanasev {Phys. Rev D55 (1 April 1997) p4380}, we show that em-ploying our results from the pion and kaon elastic structure employed there, we can obtain the electroweak form factor and parameters, f+ and f-, meeting existing data restrictions without adjusting any parameters! Still a novel result among other more encompassing and detailed multiple parameter calculations to match the growing number of precision experimental data. This result, however, became a clue to thinking that the kaon may simply be a strange excita-tion of the Flavor neutral pion. Let me explain further.

In another work, that revisits the old quark model approach with Stinson Lee {https://arxiv.org/pdf/1810.09040.pdf} we showed that, in a 1-D charged pseudoscalar meson model with no confining potential, that a numerical quantum number could be introduced in the simplest way, not only to think of the kaon as a flavor excited state of the pion, but also the D and the B are also excited flavor states. Only after I returned home from the sectional meeting did I realize this suggests the flavor states are coupled through their electro-weak/semileptonic decays; and that a type of Flavor Excited pionic "atomic" structure can be imagined and more strongly connects the physics properties of these mesons. The 1-D model calculated decay rates yield shorter lifetimes than the data; yet, inserting a linear potential will likely correct these life times as well as lighten the constituent quark masses toward more common values. The theoretical model has electroweak coupling constants that depend on the flavor. So, a more detailed calculation with a linear potential added is expected to re-quire different values for the couplings and quark masses; yet the physics will remain. This means the measured meson masses, form factor data, charge radii and meson life times should be preserved. Nonetheless, the model points the way for how one might regroup this meson set; and in this very simple specific model, the square of the charge radii naturally scal-ing as pion excites to B with an asymptotic (heavy quark limit) value of 0.107fm2.

In relation to having more data available, I look forward to exploratory experiments from ee'D and ee'B sectors that should provide more clarification and precision.

My current role as Chair of the FPS forum includes organizing FPS sponsored sessions at APS meetings Those planned for the 2026 global meeting are included in the News section of this issue.

Physical Science Careers Disrupted

Documenting the Impact of Federal Funding & Policy Changes

By Trevor Owens, AIP towens@aip.org

Presiding over the 1962 dedication of AIP's Niels Bohr Library & Archives, J. Robert Oppenheimer paused at the podium to reflect on a challenge. "We are so engulfed by the changes, the massiveness, the ferocity, the brashness…that we do not understand it very well, and it may not be possible for us to understand it." Yet he hoped our Library would enable "serious students of the human predicament in the future to know very much more about what has befallen us than we who are acting and living in it."

Robert Oppenheimer speaking at the Niels Bohr Library Dedication in New York . September 26, 1962, Credit Line: AIP Emilio Segrè Visual Archives, Physics Today Collection

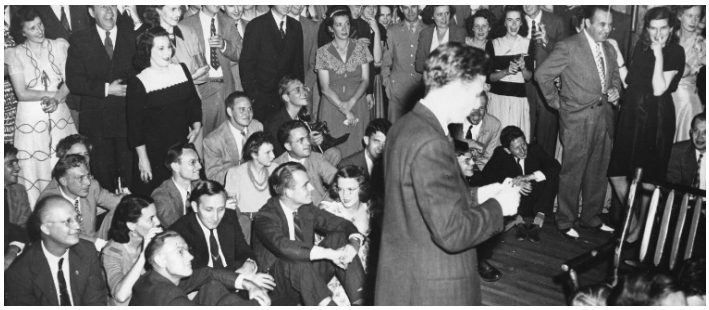
Oppenheimer believed that preserving records would reveal not only "a heroic time," but also its "robbers and fools" alongside its "great and noble" people. His charge endures: In moments of upheaval, we must gather records so future generations can grasp what we ourselves struggle to see.

Today, as federal funding and policy shifts and reshapes the physical-science enterprise, we take up that charge. Our research team is launching a new initiative to collect and preserve first-person accounts from scientists, engineers, and other professionals across the physical science enterprise whose careers and work are being disrupted.

Documenting a Once-in-a-Century Upheaval in the Physical Sciences

The rapid policy and funding shifts enacted by the second Trump Administration are upending the status quo of the physical science enterprise in the United States. Grants have been terminated , agencies are reducing their workforces , visa and immigration policies are effecting scientists, and deep funding cuts have been proposed to key scientific programs. As a result, many individuals in the physical sciences community have faced job losses and interruptions to their work and professional trajectories . Our recent report, Impacts of Restrictions on Federal Grant Funding in Physics and Astronomy Graduate Programs, shed light on the effects these changes are already having.

History offers few precedents. This spring, Will Thomas, AIP's Director of Research in History, Policy, and Culture noted in his talk, What is Going on and is the Past any Guide? how challenging it is to use history as a guide in this moment. The federal government has played a critical role in U.S. physical science progress for more than half a century—employing researchers directly, sustaining national laboratories, contracting private innovation, and underwriting university science. AIP has documented that partnership since the 1960s through our oral histories, visual archives, and archival collections. The photos threaded through this post illustrate some of that history.



Los Alamos National Laboratory scientists at a party , Summer, 1945, Credit Line: Los Alamos National Laboratory, courtesy of AIP Emilio Segrè Visual Archives, Fermi Film Collection

Today's disruptions demand fresh documentation. To meet that need, we are establishing an ongoing process to collect firsthand accounts of careers derailed or redirected by these funding and policy changes—before details fade and institutional memory is lost. Each story will be added to the Niels Bohr Library & Archives' digital repository. Based on participants choices, those stories will either be made openly available in short order or will be embargoed for a period of 5 years, ensuring that the human dimension of this era is captured for both contemporary understanding and future scholarship.

Personal Stories Give Voice to Organizational and Institutional Memory

As part of our focus on the federal physical-science workforce in our 2025 research agenda , we recently launched a set of interactive visualizations that chart 25 years of federal workforce data. These visualizations document the more than 170,000 scientists and engineers employed by the U.S. government as of September 2024. We will update these visualizations as the U.S. Office of Personnel Management releases new data.

Lawrence Livermore National Laboratory X-Ray Laser Development Team , 1980 (year approximate). Credit Line: Lawrence Livermore National Laboratory, courtesy of AIP Emilio Segrè Visual Archives, Hecht Collection.

These data alone do not convey the human toll of sudden layoffs, early retirements, or abandoned projects. We need the lived perspectives of scientists, engineers, technicians, policy staff, and others whose careers have been affected.

Frank Rhodes speaks at the National Science Foundation's (NSF) 40th birthday , May 11, 1990, Credit Line: AIP Emilio Segrè Visual Archives, Physics Today Collection.

Stakeholders across our community have urged us to work to document not only personal hardships but also the institutional memory at risk when experienced professionals abruptly leave, when international collaborations are upended by visa policy issues, or when major grants are terminated or frozen. We developed this project in response. This effort advances our research team's focus on: ensuring that records of 20th and 21st century science are preserved and used and illuminating career trajectories in the physical sciences.

We designed this initiative to complement several excellent projects already underway. The American Physical Society is collecting personal accounts to support advocacy actions. The Impact Project and GrantWatch are tracking cancelled grants, while the Organization of American Historians has begun recording oral histories with federal employees and contractors . If you share your experience with us, we encourage you to consider contributing to these efforts as well—each story strengthens the collective record.

How to share your story

If changes in federal funding or policy have cost you a job, pushed you toward early retirement, otherwise changed your employment situation, and/or if any other major federal policy changes or actions have affected your work, education, or career, we invite you to contribute your experience through our online personal narrative form.

The form should only take about ten or twenty minutes to complete. It includes five core open-ended questions and one multiple-choice question about employment sectors. Your response will be of the most direct use to current and future researchers if you are comfortable sharing your name and specific information about your role. With that noted, we also appreciate that many participants may not want to share identifying information about themselves as part of this project. As a result, we provided options for participants to remain anonymous.

Here are the prompts for the five open-ended questions we are asking participants below for anyone who wants to draft up their responses before beginning to fill out the questionnaire.

- *Tell us about yourself, your role (or former role), and your responsibilities.*
- *How did/does your work relate to the physical sciences?*
- *How are the changes in policies and funding affecting you personally and professionally?*
- *In your opinion, how might these changes in policies and funding affect the physical sciences or society more broadly?*
- *Is there anything else you would like to tell us about the impact of the changes in policies and funding for the physical sciences?*

continued

continued

The form will remain open through at least August 2026 so we can document continuing developments. If your situation further changes during that period, or if you have other updates or reflections that you would like to share, you are welcome to fill in the form multiple times.

We also welcome digital photos submissions that help illustrate your experience—laboratory scenes, fieldwork, workstation snapshots—provided you have permission to share them. Selected images will join AIP's visual archives alongside your narrative, expanding the collective record of this moment.

What will happen with your story

Every relevant contribution will be added to AIP's open-access digital repository, where it will sit alongside our biographical materials, memoirs, photographs, and oral history interviews. Stories will be added on a rolling basis, each as its own record—searchable, citable, and preserved for scholars today and tomorrow. For those who elect to have their stories embargoed, we will not provide access to those stories for a five-year period.

Dan Lester, Jesse Bregman, Harriet Dinerstein, Fred Witteborn, and Mr. Harold Crean on the Kuiper Airborne Observatory (KAO) . 1980 (year approximate). Credit Line: NASA, courtesy of AIP Emilio Segrè Visual Archives, Erickson Collection.

By default, submissions will be publicly viewable so the broader community can understand how funding and policy shifts are reshaping the physical-science enterprise. Please share only information you are comfortable making public at some point in time; if a narrative includes potentially sensitive details, we may restrict access to protect contributors' privacy while still safeguarding the historical record.

Encourage others to share their stories

Help us widen the circle. If this initiative resonates with you, share it with colleagues, students, professional societies, friends, or mentors—and ask them to pass it on through their own networks and social-media channels.

If you are interested in collaborating more directly on outreach? Let's talk. Feel free to email me (contact details on my bio page) and we can coordinate efforts.

Waiting for Robots: The Hired Hands of Automation

by Antonio Casilli. University of Chicago Press, 2025. 336 pgs. ISBN 9780226820958. $27.50

Antonio A. Casilli's Waiting for Robots: The Hired Hands of Automation is a thoughtful and well-researched book that challenges the reader to consider the role of labor in automation. The title references a play "Waiting for Godot" where the duration of the entire play is spent on characters who worry over the arrival of someone who never comes. In the end, all the anticipation, preparation, and anxiety ends up being for nothing. The impending arrival of automation has upended industries and caused many to question their futures in a rapidly changing world should this vision of total automation come to pass. Casilli has studied these trends through a sociological lens, and this book spans his research and insights from over the past decade.

The book is divided into three parts: automation and platforms, types of digital labor, and the horizons of digital labor. In the beginning, readers are introduced to the types of processes that are automated and how all the excitement surrounding automation is somewhat misleading. Some companies that claim to use "AI" are not and in fact rely on humans to do such things as make recommendations behind the scenes. Others have a hybrid model where work is produced with AI but have "humans in the loop" to engineer prompts or verify outputs. Automatic checkouts at stores or ATMs have replaced human employees but still require consumer labor.

The overarching theme of these observations is labor: who does it, where and how it is done, how we derive value from it, and how it is compensated. In the traditional sense, markets have existed where people can trade goods and services. In the digital space, Casilli describes how digital platforms have evolved in place of markets, and how the nature of these platforms is subtly different. They exist to serve a variety of needs in the population, from a ride-sharing platform like Uber to a social connection platform like Instagram. These platforms wouldn't exist in the form they are in today without the input of digital labor. A user liking a post on Instagram creates value for Instagram. Additionally, Instagram collects information about its users and can in turn use this information to pair users with content creators, influencers and advertisers. Data from humans is a necessary commodity traded on these platforms.

Although these platforms derive value from user data, they discourage any type of employer/employee compensation and protection. Users that drive for Uber are required to obtain their own driving training and provide their own vehicles. Uber is merely a platform to connect drivers with riders. Content creators for YouTube or Instagram are responsible for creating their own content with whatever tools they require. Users of these platforms who view content are not even always 'organic,' in fact, entire ecosystems exist in various countries of manufactured users who promote content unrelated to their individual needs. Humans are integral to the growth and success of these platforms, providing digital labor that goes largely uncompensated.

What about the labor involved with AI itself? AI training has in many cases been converted into microwork - either small tasks that can be done by those in low-income countries such as translations or picture annotations, or crowd-sourced tasks done by anyone who has completed a CAPTCHA. This type of work has shifted work away from skilled and expensive employees to those willing to do gig work and work for much lower wages and forgo security. This growing disconnect between labor and capital has led to such practices as stock buybacks rather than investing in innovation. For a more automated world, we need more innovation and current economic incentives seem unlikely to produce that.

Casilli writes persuasively that while we are focused on a future of automation that will never truly happen, we are starting to either hide or lower the value of labor, or both. While we 'wait for robots,' we are changing the definition of how and where labor happens, to our possible detriment. In this review, I have done my best to communicate some of the main themes of this book. Even after I finished the last page, I still find myself thinking about this book. If these themes are of interest to you, I highly recommend giving this book a shot - and if you're so inclined, let me know what you think.

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Nuclear War: A Scenario

by Annie Jacobsen (Dutton, New York, 2024). 400 pgs. ISBN 978-0593476093 (hardcover), $30.

This horrifyingly compelling book is a work of both fiction and fact. The fiction is a minute-by-minute account of how a large-scale nuclear war between the United States and Russia breaks out after the US is attacked by North Korea. This apocalypse is the backdrop for a factual survey of how the world has come to the nuclear situation of today: The evolution of warheads and delivery platforms, the system of space and land-based surveillance assets for detecting missile launches, and how alerts are distributed to missile-launch command centers and up through the chain of command to the President, who would have only minutes to decide upon retaliatory options. Sidebar history lessons feature capsule descriptions of the theory of deterrence, launch- on-warning, ICBMs, the President's Football, Permissive Action Links, nuclear-armed submarines, North Korean nuclear and missile developments, the 1983 Proud Prophet war game which predicted that any nuclear exchange will likely escalate into all-out war, and the effects of radiation poisoning. The latter is personified via a particularly gruesome description of the death of Louis Slotin following a criticality accident at Los Alamos in 1946.

Many P&S readers will be familiar with Jacobsen's analyses of the science-military-government nexus from her earlier books such as Operation Paperclip and Area 51. As usual, she has done her homework: Nuclear War has been meticulously researched with authoritative information drawn from books, articles, congressional testimony, briefing papers, and interviews with current and former principals in the nuclear weapons field. The source notes run to 40 pages. Jacobsen's scenario may be a bit of a stretch, but the underlying information is sound.

Nuclear War comprises a brief Prologue and five main parts. The Prologue describes the effects of a one-megaton strike on the Pentagon that destroys the surrounding area and generates a firestorm that consumes all of Washington, DC. This is revisited in deeper detail in Part III. Part I is similarly brief, giving a survey of the history of nuclear war-fighting plans, and descriptions of a 13-year-old's memory of surviving Hiroshima, the development of fusion weapons, and the buildup of the US nuclear stockpile following World War II.

The heart of this book is Parts III and IV. Each describes events in a 24-minute interval over which Armageddon unfolds. In a brief review it is not possible to capture all the details, but a very abstracted version follows.

North Korea launches a Hwasong-17 ICBM with a one-megaton warhead targeted for the Pentagon; flight time is 33 minutes. The launch is immediately detected by satellite, and command centers are alerted. Within minutes, the Secretary of Defense (SecDef) and Chairman of the Joint Chiefs of Staff (CJCS) race to a Pentagon bunker, while the President is hustled to a bunker within the White House. The Commander of Strategic Command (STRATCOM) has a Doomsday plane waiting but must speak to the President first. The launch is confirmed by ground-based radar, but interceptor kinetic-kill projectiles fail to strike the warhead.

At the 14-minute mark, it is decided to evacuate the President by helicopter to an underground command center in Pennsylvania, Site R; the SecDef and CJCS will separately evacuate to the same site. At 16 minutes, a second North Korean launch is detected, a short-range ballistic missile targeted at the Diablo Canyon nuclear power plant in California. This has only a five-minute flight time, and the 300-kiloton surface burst destroys the reactors, sends their vaporized cores and spent fuel into the air, and ignites wildfires for miles around. A video posted to social media goes viral.

Two minutes after the detonation, the President authorizes a counterstrike against North Korea of 50 land-based ICBMs carrying one warhead each and eight SLBM Trident missiles (which guide themselves by a form of celestial navigation!) with four warheads each from a submarine in the Pacific. A Russian asset witnesses the ICBMs launch and informs Moscow. However, the ICBMs must overfly Russia to reach their targets in North Korea. The North Korean Supreme Leader is ensconced in a 1,900-foot-deep bunker, where he and his staff can survive for decades.

Part III opens at the 24-minute mark. As the missile headed for the Pentagon begins its re-entry phase, the President supplies a "universal unlock code" to the STRATCOM Commander in case he becomes incapacitated. The SecDef is desperately trying to contact Russia. The President is parachuted out of Marine One just as the warhead detonates over the Pentagon; he is seriously injured and will not be found. In Washington, essentially everything within a nine-mile diameter zone is instantly incinerated or destroyed, along with 1-2 million inhabitants. The STRATCOM commander boards the Doomsday plane, from which he can launch all remaining US missiles.

Russian satellites detect the US ICBM launches but report the missiles and their decoys as hundreds of projectiles; the American SLBMs also launch. Attempts to contact Russia are fruitless as officers there will have their President speak only to the US President. NATO bases go on alert, which Russia interprets as preparation for strikes.

At 40 minutes, the North Koreans launch another ICBM toward the US, but this one will burn up on re-entry. At the 45-minute mark, the Russian President, lodged in a bunker in Siberia and with no communication from his counterpart,

authorizes his most extreme counter-strike option: some 1,000 ICBMs targeted for the US. These are instantly detected by US satellites, which alert the Doomsday plane and remaining command centers. In addition, three Russian submarines in the arctic and two in the Atlantic each fire 16 missiles at targets in the US and NATO bases.

Part IV opens at 49 minutes, the SecDef, now Acting President, authorizes his most extreme strike option against Russia: 350 ICBMs plus Trident missiles from 10 submarines. At 52 minutes, much of North Korea is incinerated. But the Supreme Leader has two remaining cards to play: A satellite-based electromagnetic pulse weapon overflying the US, and a volley of thousands of Sarin-filled shells launched at Seoul and bases in South Korea. The EMP cripples practically every personal electronic device and element of computer-controlled infrastructure: power plants, industries, aircraft and traffic control, transportation networks, utilities, and vehicles. At 57 minutes, Russian SLBMs begin striking their targets in America and Europe; 15 minutes later, the ICBMs begin striking their targets. The last salvos to launch are Trident missiles from US submarines.

Part V offers a look at the aftermath of firestorms and nuclear winter. Anyone remaining will face mass starvation, extinctions, toxic pollution, radiation, collapse of food chains, and a largely ruined ozone layer. Plagues and epidemics are likely after the thaw begins. In an epilogue set 24,000 years in the future (about the half-life of Pu-239), Jacobsen asks us to imagine what any descendants might make of the ruins of civilization.

I came away from this book with a profound sense of helplessness. The nuclear landscape of weapons research, design, testing, production, deployments, maintenance, and command-and-control seems an impenetrable and potentially unstable empire. Jacobsen offers no suggestions as to how we might tame this predicament, but, in fairness to her, in a world with leaders who seem unstable, paranoid, or delusional, even obvious ideas like trying to reduce numbers of weapons and walk back launch-on-warning postures are likely to gain little traction. Established nuclear powers are expanding and upgrading their arsenals, arms-limitation treaties are eroding, and it is easy to foresee proliferation if Western countries deem that they can no longer depend on US protection. Jacobsen ends with the thought that the enemy is not another nation or group, but rather nuclear weapons themselves. As a firm believer that Hiroshima and Nagasaki helped end World War II and that deterrence has worked, I cannot wholly agree with this thesis. But effective deterrence presumes that national leaders will act rationally, and I am not optimistic.

My one quibble with this work is that it needs a Glossary of acronyms; there are so many protocols, offices, positions, and systems that one's head spins. Some of the terms will be familiar (NATO, POTUS), but I counted over 30 more obscure ones.

Anybody concerned for the survival of humanity needs to read this book. Unfortunately, those that should do so the most probably won't.

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