



Federal Research Briefing and Workshop

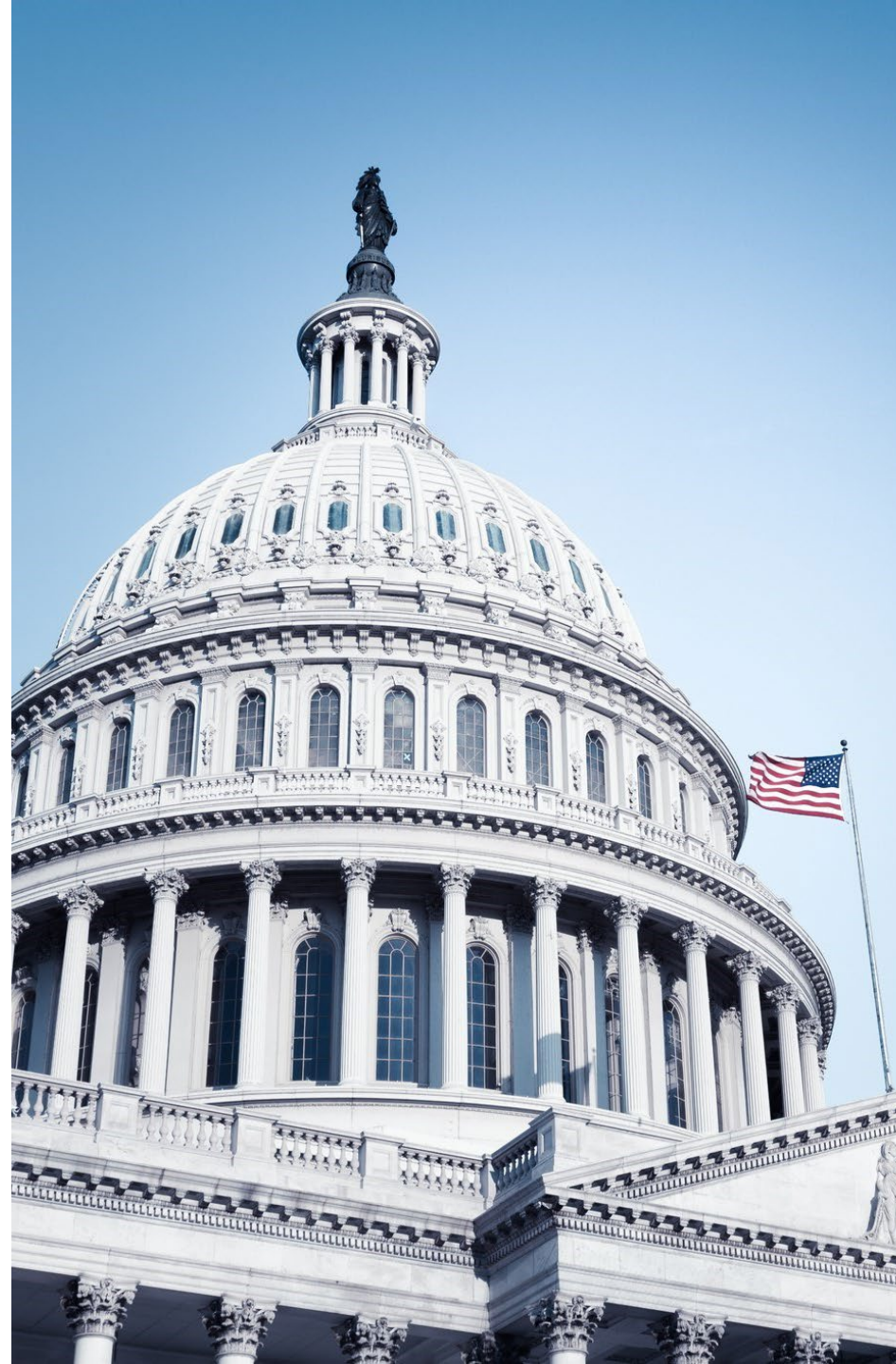
October 27, 2022

Bobby Babcock
Kevin Kelly

World Changers
Shaped Here



SMU®



Presentation Agenda

- **Basics of Federal Budget & Appropriations**
- **Federal R&D Focus Areas FY23 and FY24 Look Ahead**
- **R&D Provisions in Major Legislation in 117th Congress**
- **Selected Areas of SMU Research Focus and Areas of Corresponding Federal Alignment and Opportunity**
- **Designing Federal Requests/
Capturing Large Awards**
- **Discussion/Questions & Answers**

Basics of Federal Budgeting & Appropriations

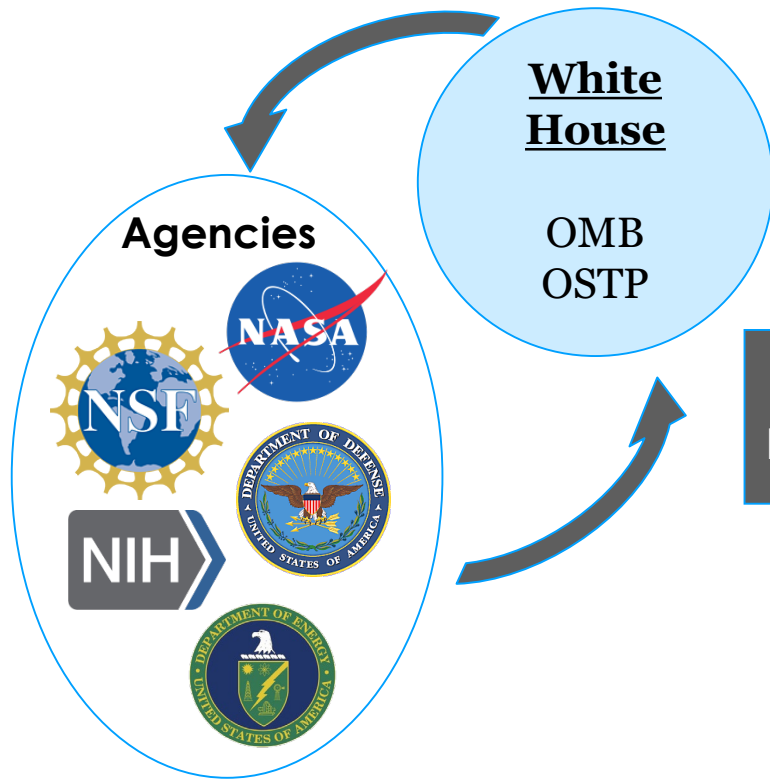
“Love is where you fund it.”



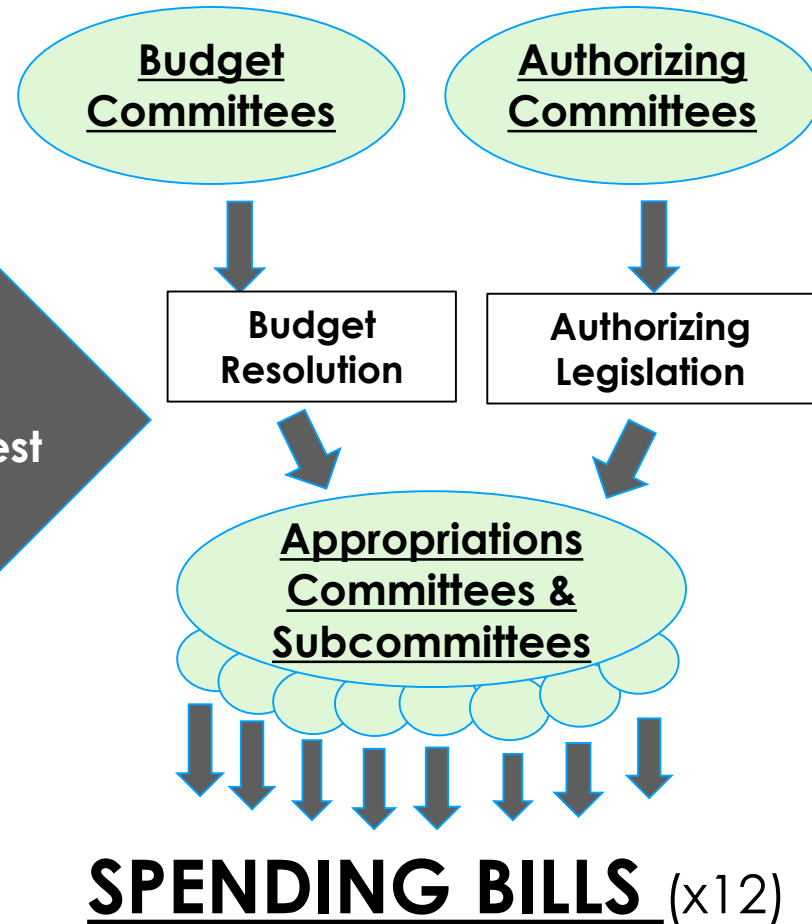
The Annual Budget Process at a Glance



Executive Branch

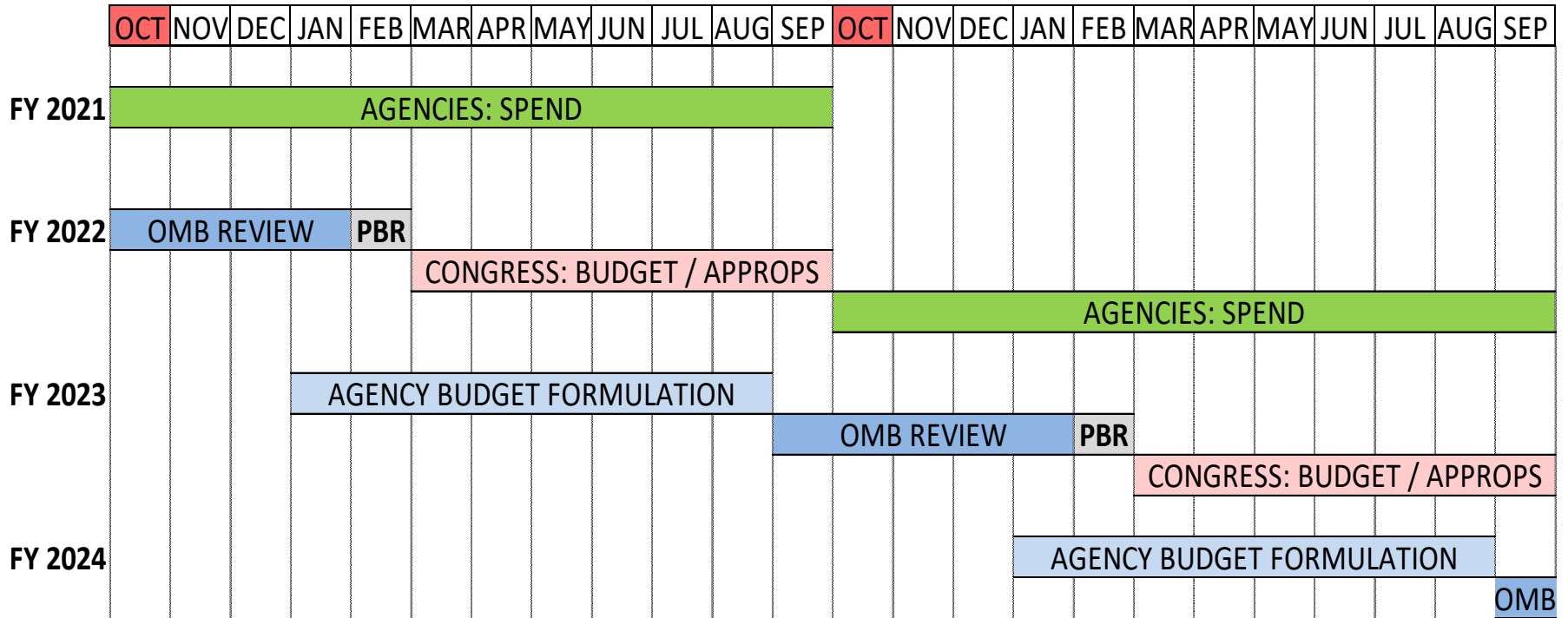


Legislative Branch

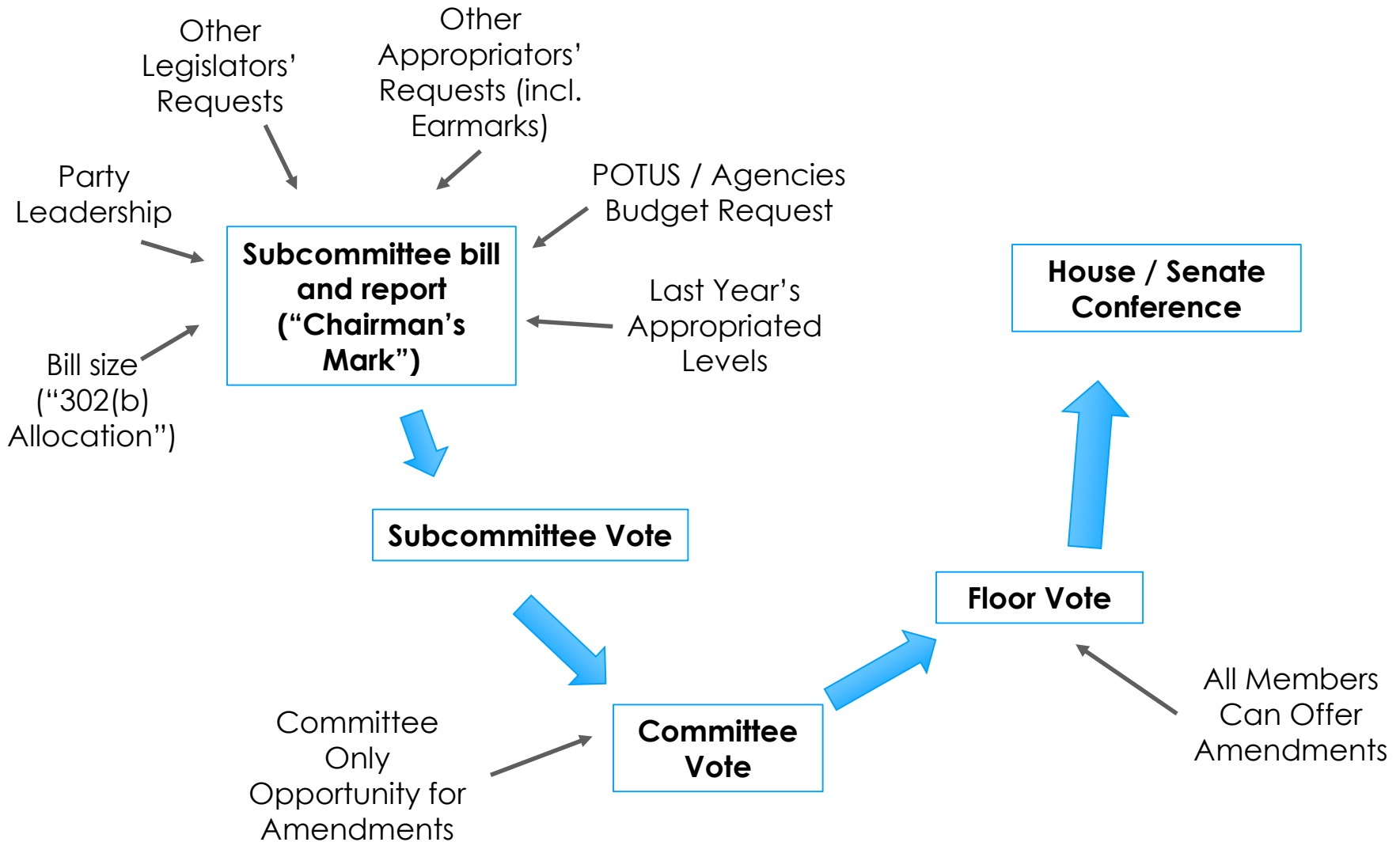


The Federal Rubik's Cube: Three Budget Cycles Always Moving Simultaneously

We are currently here



Congressional Appropriations Input and Process



What Factors Influence Appropriations?

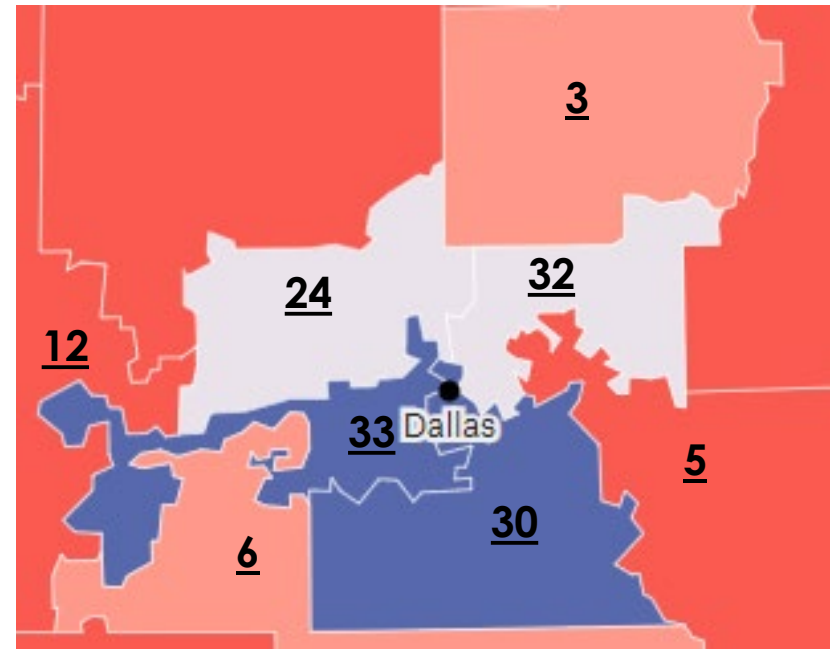
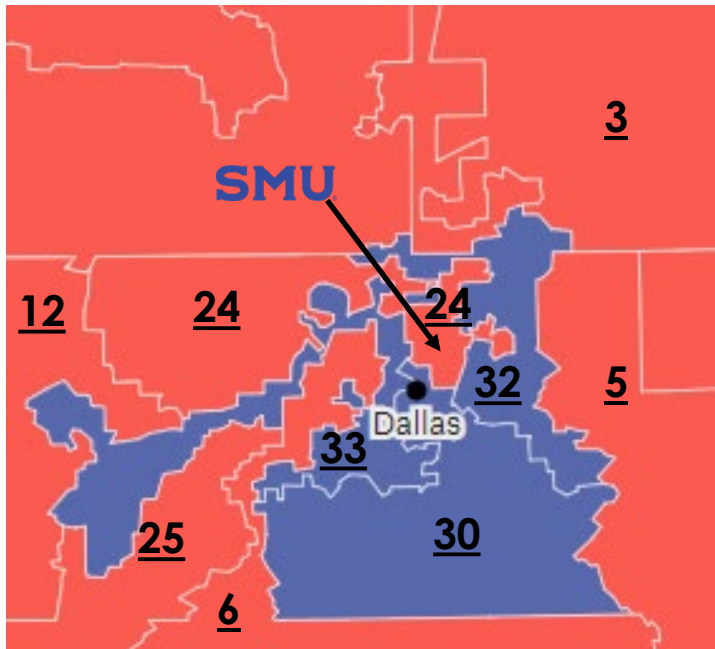
- **The “public interest.”** - national challenges, security, public health, economic competitiveness, functioning of government, etc...
- **Agency mission.** What is its purpose or emphasis? Critical particularly when it comes to science.
- **State of the economy.** Current & future fiscal environment.
- **Who’s in charge?** What is their ideological tilt and who are their core constituencies?
- **What does a Member care about?** Legislator’s policy and personal interests.
- **Profession of a Hill Sponsor.** Legislator’s professional background.
- **How does it “play in my Peoria?”** “All politics is local.” (The first principle of good government – “get elected.”)

Texas Redistricting in Dallas

Limited turnover, more safe seats for Dallas delegation

New Map

Old Map



Reps. Eddie Bernice Johnson (TX-30) and Van Taylor (TX-3) retiring, though seats will stay in same party.

Who's Who in Dallas-Area Congressional Delegation?



Kay Granger (TX-12)
Ft Worth (HAC Chair?)



Beth Van Duyne (TX-24),
new SMU rep



Jasmine Crockett,
D nom. in TX-30
(Dallas)



Marc Veasey (TX-33),
Fort Worth



Collin Allred (TX-32),
lost SMU in
redistricting



Keith Self, GOP
nom. in TX-3
(Plano)

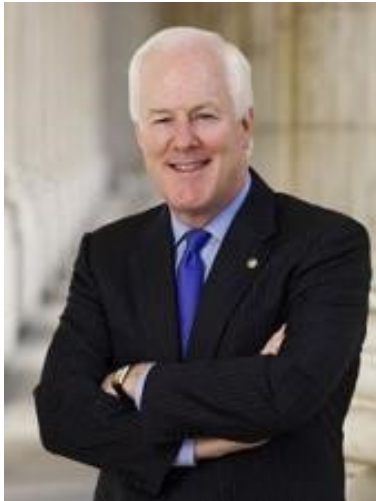


Jake Elzey (TX-6),
Midlothian



Lance Gooden (TX-5),
Canton

Who's Who in Texas Delegation? (cont.)*



**Senator John
Cornyn (Austin)**

Reelected in 2020

Committees:

- Finance
- Judiciary
- Intelligence



**Senator Ted Cruz
(Houston)**

Reelected in 2018

Committees:

- Foreign Relations
- Judiciary
- Commerce, Science, and
Transportation (Chair or RM)

Texas Appropriators



Kay Granger (TX-12),
Ft Worth (HAC Chair?)



Henry Cuellar (TX-28),
Laredo (HAC)



Tony Gonzalez (TX-23),
San Antonio (HAC)



John Carter (TX-31),
Round Rock (HAC)

Federal Research & Development Overview

FY23 Budget and Appropriations Update and FY24 Look Ahead

Where is the Fed Gov't Going?



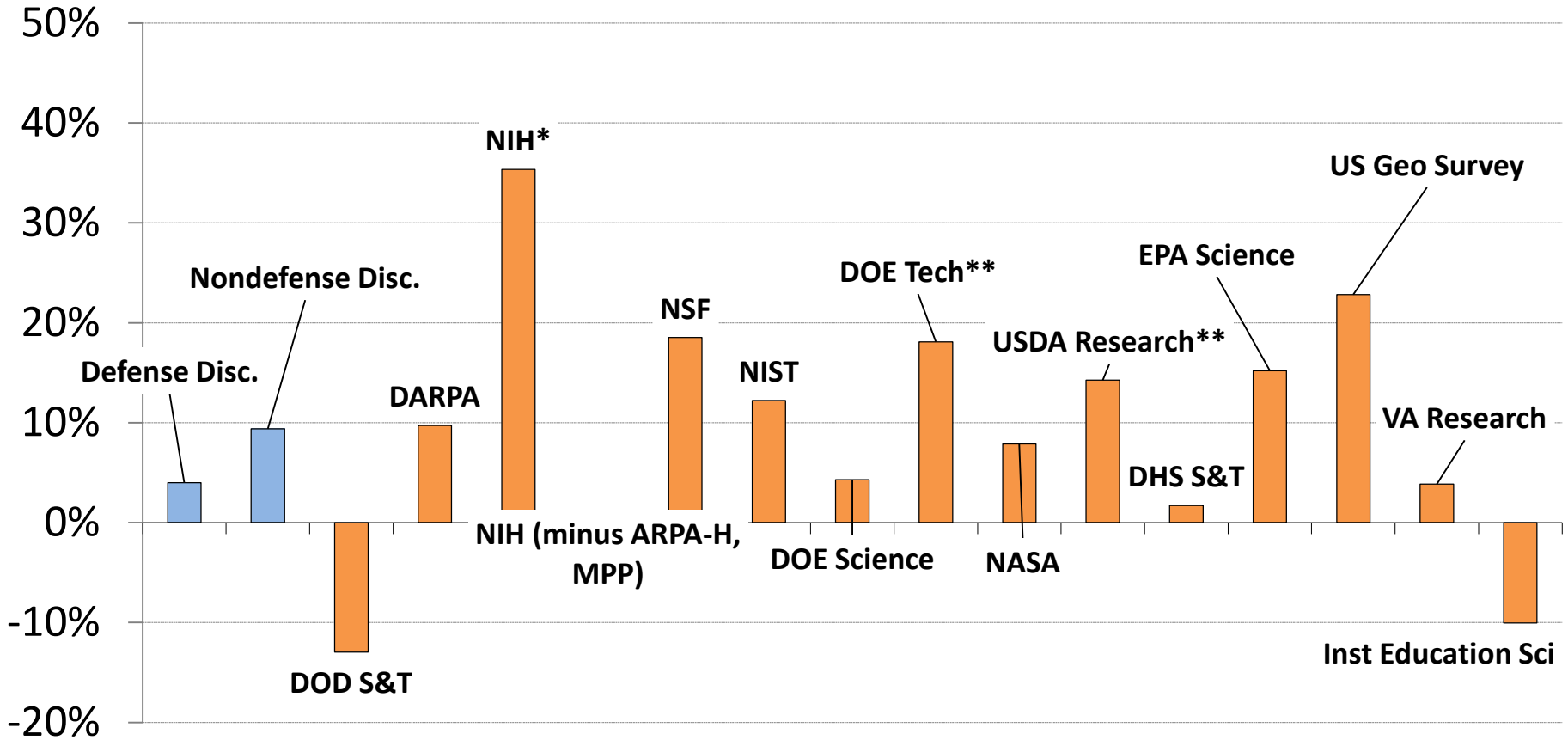
What Has Biden Proposed for R&D in FY23?

- **More modest growth.** In a “bow to reality” Biden’s FY2023 budget request calls for a 9.5% increase in domestic discretionary spending and a 4% increase for defense (last year those numbers were 16.5% and 1.8% respectively);
- **Mixed on basic science.** Requesting a 19% increase for the NSF, a 9.6% boost for the NIH, 4.5% more for the DOE’s Office of Science, and a 5% hike for NASA’s science missions;
- **Targeted areas.** Seeking significant funding increases across science agencies focused on health, manufacturing, renewable energy, and climate. Seeking large investment (\$5B) in “ARPA-H” again as opposed to increasing base NIH budget (Congress provided only \$1B for ARPA-H last year);
- **NSF Technology Directorate.** Repeats proposal for \$200 million per year for regional “innovation engines” to advance emerging technologies and regional workforce and economic needs of various regions of the country;
- **Earth first.** DOE Office of Science (BER), NOAA, and NASA all see boosts for climate, earth sciences and weather research.



Proposed Increases in Science and Technology Programs in the FY2023 Request

Nominal Percentage Change from FY2022



*Includes ARPA-H and Mandatory Pandemic Preparedness
 **ARS, NIFA, ERS, NASS, Forest Service Research. | AAAS 2022



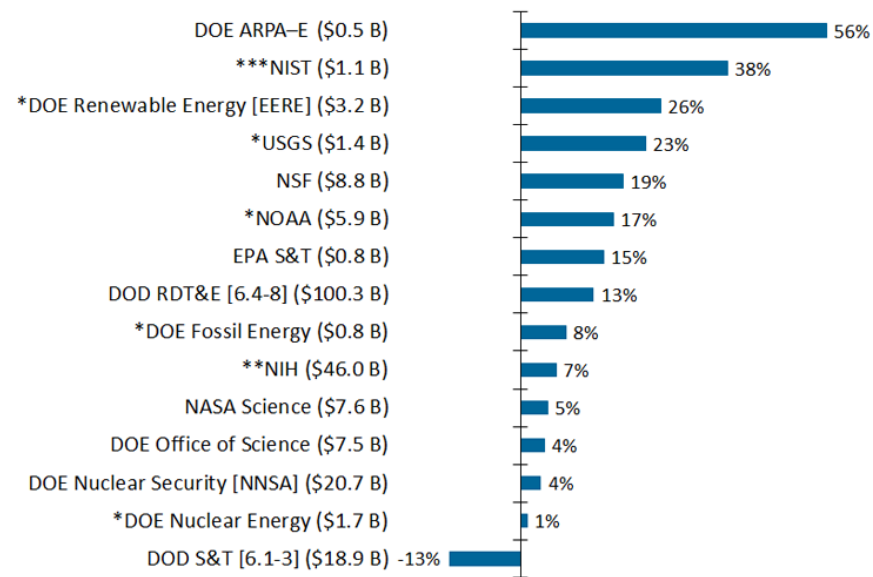
Status of FY23 Appropriations: Progress Made, But.... SMU

- **House.** Passed all bills out of Committee, just half have passed on the floor. (MIA: CJS, DOD, DHS, Leg Branch, L/HHS/Ed, SFOPS = > 70% of all spending);
- **Senate.** The Committee has released all 12 of its drafts but cannot hold markups without GOP support; no floor action anticipated;
- **CR thru December.** A Continuing Resolution covers government spending through December 16th;
- **But, but, but....** Will there be a compromise reached in this year's lame duck session.

FY23 Budget Request

% change from FY22 enacted

\$ in () are FY22 amounts



* Excludes funds from the Infrastructure Investment and Jobs Act.

** Includes funds for ARPA-H.

*** Excludes earmarks.

American Institute of Physics | aip.org/fyi



Looking Forward to FY24: OSTP (A. Prabhakar) & OMB (S. Young) Federal R&D Priorities Memo SMU

Biden Priorities = the “4 C’s” (Covid, Cancer, Climate & CHIPS), & don’t forget DEI (diversity, equity, inclusion).

This annually produced memorandum outlines Administration's multi-agency R&D priorities for agencies to consider when formulating their next budget submissions to OMB. Biden’s FY24 memo provides 7 priorities:

- **Pandemic Readiness and Prevention (CDC, NIH)**
- **Reducing Cancer Death Rate by Half (Moonshot, ARPA-H, NIH)**
- **Tackling Climate Change (NOAA, NASA, DOE, EPA, Others)**
- **Advancing National Security and Technological Competitiveness (DOD, Commerce, NSF, Others)**
- **Innovation for Equity (Applied to Many Agencies/Programs)**
- **Cultivating an Equitable STEM Education, Engagement, and Workforce Ecosystem (NSF, Ed, Labor, Others)**
- **Promoting Open Science and Community-engaged R&D (Government Wide)**



Major Legislation of the 117th Congress: Research & Development Provisions and Focus Areas

**R&D Priorities, CHIPS and Science Act, Reconciliation Bill, and
Bipartisan Infrastructure Package**



Bipartisan Infrastructure Package (IIJA/BIL)

- **Approaching One Year Anniversary.** On November 15th, 2021, President Biden signed into law the Infrastructure Investment and Jobs Act/Bipartisan Infrastructure Law.
- **Multiyear Mandatory Funding (Real \$\$).** Provides \$1.2 trillion over 8 years for infrastructure improvements, including more than \$500 billion for core infrastructure projects such as roads, broadband, and electric utilities improvements.
- **Limited R&D.** Most of the funding for climate, energy, microelectronics, and other R&D was proposed and passed in others bills (e.g., BBB, CHIPS & Inflation Reduction Act).
- **Some University Opportunities.** Includes emerging transportation technology research, clean energy production R&D at DOE, renewal of University Transportation Centers, building training and assessment centers, electric grid resilience, climate resilience.

Bipartisan Infrastructure Package - DOE Highlights

Per DOE guidance this month, DOE grant applicants must include plans to boost diversity and equity

- **Clean Energy Focus:** \$21.5 billion over 5 years for the new DOE Office of Clean Energy Demonstrations;
- Across DOE's existing offices, the bill also includes \$16.3 billion for the Office of Energy Efficiency and Renewable Energy, \$8.1 billion for the Office of Electricity, and \$7.5 billion for the Office of Fossil Energy and Carbon Management;
- **Hydrogen R&D:** Vastly expands DOE Hydrogen R&D and demonstration activities, allocating \$8 billion to establish four regional clean hydrogen hubs, \$1 billion to support hydrogen electrolysis demonstration projects aimed at reducing production costs, and \$500 million for a clean hydrogen manufacturing and recycling program; and
- **Carbon Reduction:** \$3.5 billion to establish four "regional direct air capture hubs," \$2.5 billion for a carbon capture demonstration program, and nearly \$1 billion for carbon capture technology pilot projects.

CHIPS and Science Act

Final package based on Senate's USICA and House's America COMPETES bills

- **Microelectronics focus.** Culmination of many years of effort in Congress to boost domestic manufacturing, improve domestic technical competitiveness, strengthen research security, and onshore critical supply chains.
- **Now law.** Biden signed on August 9, 2022. Rolling release of \$52+ billion in CHIPS funds and multiple program opportunities.
- **Cash for Semiconductor activities.** \$39 billion is for matching grants to industry for new domestic semiconductor manufacturing factories, to be awarded over 5 years.
- **Advanced microelectronics R&D.** \$13+ billion over five years to be divided among 4 key programs through the Commerce Department, a new DOD Microelectronics Commons Fund, and a modest workforce program at the NSF (& DOD). Detailed plans for each required on a rolling basis for later this year (Oct-Nov).
- **All other science subject to future budget battles.** The “Science” piece of the bill is \$160 billion in new authorizations for DOE, NSF, NASA, & NIST, but no money. It is a “hunting license” for future budget requests and appropriations bills.

Budget Reconciliation Package – Inflation Reduction Act

Slimmed-down version of the original “Build Back Better” Package

- **Scale:** \$485 billion in new spending and tax incentives and \$300 billion in deficit reduction, a far cry from the original \$2 trillion version of BBB from 2021.
- **Enacted:** Biden signed on August 16, 2022.
- **Build Back Manchin:** The “budget reconciliation” process allowed Senate Democrats to avoid the filibuster (60 votes) but limited the package to “revenue & spending.”
- **Priority emphases:** Climate change via mechanisms to encourage cleaner energy production & reduction of methane; electrification of the grid with *heavy* emphasis on tax credits for EVs, solar, and other renewable energy technologies.

Reconciliation & Infrastructure Observations

- Agencies in some cases have been given broad authority and little specific direction from Congress on the use of funds.
- Agencies may also have a variety of approaches as to how quickly they disburse funds, and electoral pressures (2022 and 2024) may drive some spending decisions forward.
- **A suggested path on pursuing opportunities arising from these new initiatives includes:**
 - **Develop a hook.** Apprise SMU research office and government relations of your interest in an area.
 - **Find a federal champion or partner.** Make a contact plan with key agencies, including precursor due diligence on their approach and who are the decision makers
 - **Write it up in plain spoken English.** Formulate short papers to help federal executive branch officials shape how these programs should be structured (content and mechanism)
 - **Coordinate with Government Relations.** Consider having the Hill weigh in with the Agencies to echo the suggestions in your papers

Selected Areas of SMU Research Focus and Areas of Corresponding Federal Alignment and Opportunity



Microelectronics: CHIPS and Science Act

Provides \$11B+ (over 5 years) to support several research programs exploring key areas of microelectronics/chip development, including:

- **DOC National Semiconductor Technology Center (NSTC):** A public-private partnership to conduct advanced semiconductor manufacturing R&D and prototyping; invest in new technologies; and expand workforce training and development opportunities.
- **DOC National Advanced Packaging Manufacturing Program:** A Federal R&D program to strengthen advanced assembly, test, and packaging (ATP) capabilities, in coordination with the NSTC.
- **DOC Manufacturing USA Semiconductor Institute:** A partnership between government, industry, and academia to research virtualization of semiconductor machinery, develop ATP capabilities, and design and disseminate training.
- **DOC Microelectronics Metrology R&D:** A NIST research program to advance measurement science, standards, material characterization, instrumentation, testing, and manufacturing capabilities.
- **DOD Microelectronics Commons Fund: (\$2B)** A national network for onshore, university-based prototyping, lab-to-fab transition of semiconductor technologies, including DoD-unique applications – and workforce development programs.



Artificial Intelligence (AI)

Federal Overview: Approximately 14% of Federal IT spending (\$1B+ annually) is for AI R&D. The National Artificial Intelligence Initiative (NAII) launched 2021, led by OSTP to oversee and coordinate efforts.

NAII Six Strategic Pillars: Improving AI innovation, advancing trustworthy AI, creating new education and training opportunities through AI, improving existing infrastructure through new technologies, facilitating federal and private sector utilization of AI to improve existing systems, and promoting AI internationally.

Basic and Applied Research Opportunities: NSF funding AI Research Institutes focusing on fundamental AI tech, while NIST, DOE and DOD have programs that are focusing on more applied uses of AI.

Understand Agency AI Guidance: All Federal agencies have been required to develop “AI Strategic Plans” – study these to understand how they envision supporting R&D and using AI to improve their missions, tailor your proposals accordingly.



Cybersecurity

Federal Overview: Cybersecurity R&D presently makes up almost 10% of federal IT spending, and is growing rapidly;

Lead Federal Agencies: NIST focuses on standards based research, NSF on basic research, DHS (CISA) now has a growing role, and NSA & DOD heavily involved in both workforce, R&D initiatives and applied cybersecurity programs;

Federal Cybersecurity R&D “Roadmap”: OSTP and others update the *Federal Cybersecurity Research and Development Strategic Plan* every 2-3 years. Has an “Implementation Roadmap” which gives a detailed crosswalk of what each agency is specifically prioritizing;

Texas Assets & Alignment: Deason Institute; Dallas FBI active in cyber; do Dallas-area schools or HBCUs have needs SMU can fill? Look for state industry projects and workforce partnerships that have federal hook.

Crime

Federal Overview: President Biden requested \$3.4B in discretionary funding for OJP in FY23, an increase of \$435M. \$25M increase in PBR for Research, evaluation, statistics, and research, development, and evaluation programs to total more than \$88M.

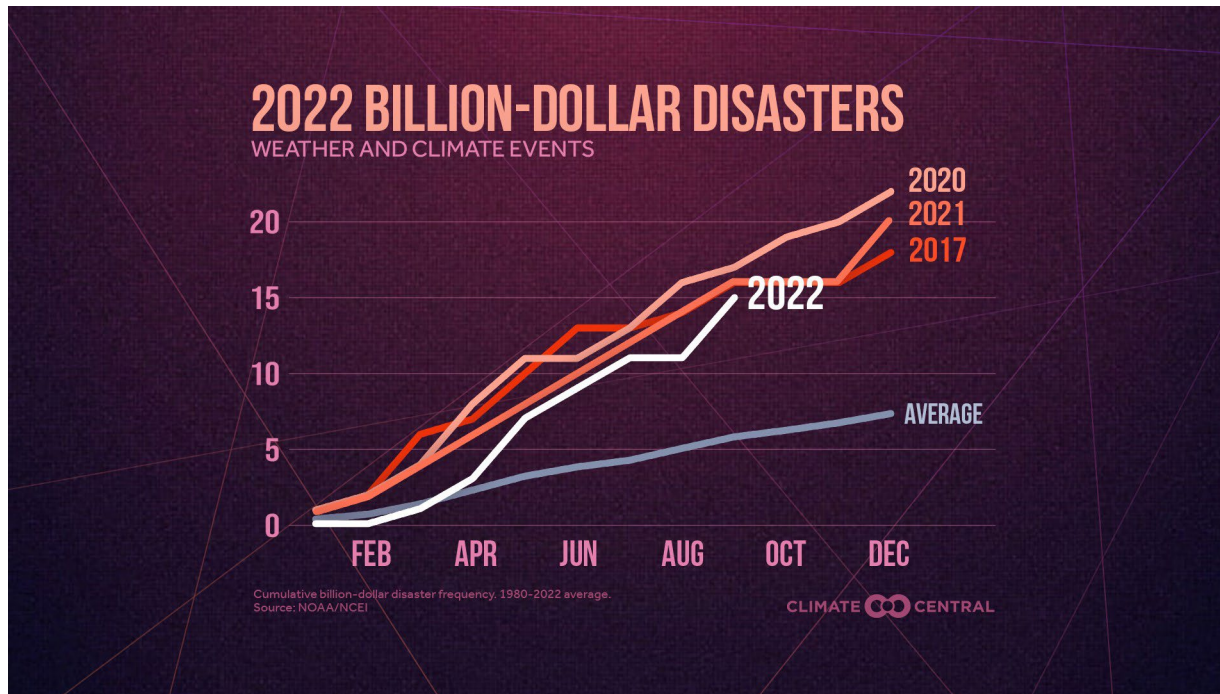
OJP Priorities: Strengthen **public safety**, prevent **gun violence**, and increase community trust; **Advance justice system reforms** to promote community safety and well-being, equity, and justice for all; Counter the rise in **hate crime** through support for communities, law enforcement, criminal justice agencies, and collaborative efforts; Ensure rights, access, and **equity for all victims of crime**; and **Advance innovation and the use of science**, research, and statistics.

SMU Building a Record: Two of SMU's most successful Congressional efforts have had to deal with data analysis associated with policing and human trafficking;

Bipartisan Gun Bill: Passed this year, included limited funding for school safety and violence prevention research (<\$1M in PBR).



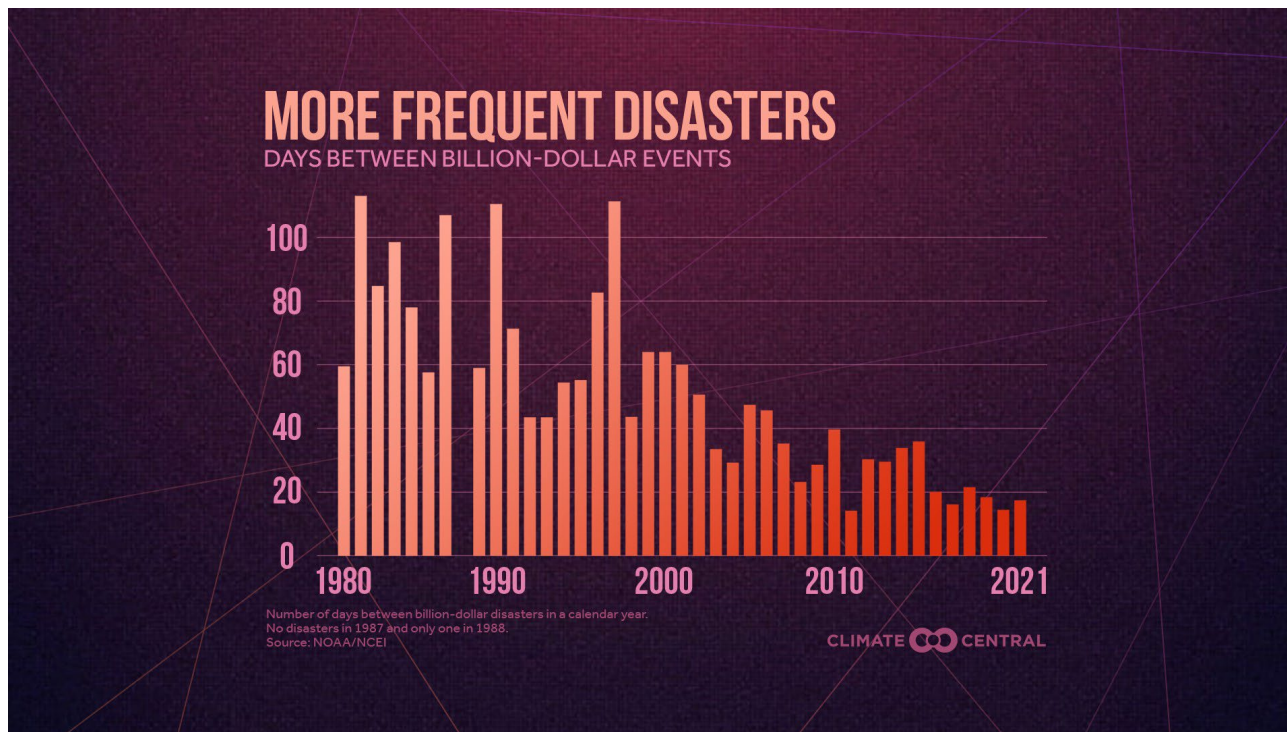
IIJA, IRA, and CHIPS+ all support clean energy, climate science, and resiliency



Reframe Existing Research: Reframe projects SMU is already developing such as remote sensing in geohazards or smart infrastructure living labs to address climate vulnerabilities.

Extreme Weather is More Frequent and Federal Efforts are All-Encompassing

Heat is studied through health disparities, migration patterns, communications



Urban Initiatives: Currently, Texas averages 60 days a year with temperatures reaching extreme and dangerous levels. By 2050 that could be 115 days. Unequal impacts of air & other pollution in urban areas now a focus at several agencies (HUD, EPA, NOAA, FEMA)

Climate Equity is Key, but so is modernizing infrastructure to be green

Focus of Biden & Current Congress: Significant parts of the IIJA support infrastructure and climate equity; ***the next Congress may not be as supportive...***

IIJA for Universities: Building Training and Assessment Centers to educate engineers about modern building technologies (GSA Proving Ground potential resource?); DOT COE for Resilience and Adaptation; creative ideas to monitor infrastructure health?

Materials Sciences: Is SMU active in materials sciences? 3-D printing, smart concrete, sustainable metals, etc.

Texas Ecosystem: Research projects and partnerships to study range of societal problems; Smart Infrastructure/Living Labs; Gulf Coast Consortium; Texas drought in most of 2022; major water troubles in West.

Biomedical Research – ARPA-H

Game changer in federal health research? Yet to receive meaningful funding

New Player on the Field: First proposed by Biden in 2021, it was authorized and initially funded by the FY22 Omnibus Appropriations package (at a level of just \$1 billion, when ~\$6 billion had been requested) in March 2022;

Modeled on DARPA: To provide leadership for high-risk, high-reward biomedical and health research to speed application and implementation of health breakthroughs equitably;

Leadership: Dr. Renee Wegrzyn recently tapped to be the inaugural Director of ARPA-H. She was previously at a Boston/MIT-based genetic engineering company and has a DARPA biotechnology background;

Organization of New Independent Agency Within NIH: Will utilize different funding mechanisms & more emphasis on research with industry partners. Will start hiring Program Managers soon, which will give indication of diseases/areas of health care of initial focus (in addition to cancer);

ARPA-H Headquarters: Rep. Kay Granger pushing for North Texas location, other states bidding include NC, MA, MO, CA, PA and GA.



Biomedical Research – Data and Health Informatics

Health Research is more data-driven and holistic than ever before

National Institute of Biomedical Imaging and Bioengineering (@ NIH):

Supports research to develop solutions to real-world healthcare problems:

- Bioimaging
- Bioengineering
- Informatics
- Training

Where are the holes? Does the existing federal health research enterprise capture the well-being of every population? Can it be improved?

Equity: Workforce opportunities to involve racially and ethnically underrepresented populations in biomedical imaging, bioengineering, and bioresearch.

Examples of current efforts: maternal health disparities; COVID testing for people with disabilities; technology development to reduce health disparities

Manufacturing & Sustainability

Biden's Big Bets: Follow the money – WH is betting big on domestic EV and EV battery manufacturing, on-shoring more of the semiconductor industry;

Sustainability Focus: Growing focus on helping manufacturing sector lower energy usage, waste and decarbonization (industrial sector 1/3 of emissions);

Department of Commerce Leadership: Funds Manufacturing USA institutes and Manufacturing Extension Partnership (MEP). White House/DOC just released the National Strategy for Advanced Manufacturing, 4-year plan focused on build strong U.S. supply chains, invest in R&D, and train the workforce – organized around 12 strategic objectives;

Growing DOE Role: Recently released a “Industrial Decarbonization Roadmap” and new \$104 million funding opportunity to advance industrial decarbonization technologies; Funds Industrial Assessment Centers and also has a focus on water use by industry;

DOD Interests: Advanced manufacturing needed for specific systems (hypersonic craft, submarines, etc.). Limited 6.1 and 6.2 programs for universities, much more funding goes to defense industry players.



Designing Federal Requests and Capturing Large Awards

“Follow the Money.”



Federal R&D Overview & Advocacy

- We are looking for federal resources that the system needs in certain targeted areas, to take SMU's research and education programs to the next level.
- That is **the** federal relations mission.
- And if we know where we want to go, then we must ask: what's the best way to get there?
- To have a coherent strategy, we must know the Federal R&D zeitgeist:
 - Evolving areas of R&D emphasis by the WH, OSTP, OMB, and Federal mission agencies – what's in and what's out;
 - What mechanisms do Agencies use to fund university R&D; and
 - What is Congress funding and what agencies/programs are disfavored for various reasons.

Needs Assessment

What investments does SMU need to go from good-to-great in selected areas of research emphasis?

- The University “foundation” – human and physical infrastructure:
 - People
 - Facilities
 - Equipment
- What is our triage intervention that creates a critical path to greatness?
 - Who on the faculty can we scale from a solo act to a team & will they be team players?
 - What is the connection between State funding and private philanthropy to our scientific research aspirations?
 - What public good or benefit will result from this investment?
 - What is the path for sustainment of our aspirations?



How to Get R&D Funding Using Congress

Program Level Expansion

- Plus up the budgets of existing programs in which you are heavily involved (e.g., defense, animal genomics) or could be more involved.

Create a New Program

- Propose a new pilot or demonstration program at a federal R&D agency to provide funding to a new/unique area of research.

Create a “Narrow Class” of Competition

- Use report language to structure new competitive opportunities in such a way to make you prohibitive favorite to win awards.

Hard Earmarks (TBD next year!)

- Depending on the agency, these can provide direct support for buildings, instruments, or research (paying for faculty time to conduct research). But they are of limited amounts and duration.



Proposal Development - Strategic Objectives

Undertake a frank evaluation: Assess each proposed initiative for its research proficiency to determine if it is:

- World Class/One-of-a-kind?
- Competitive?
- Emerging?

“Who” is as important as “what”? Identify and support the “stars” on the faculty:

- Most research universities rely on their top 10%.
- Faculty with competitive federal funding track record.
- Researchers who have or are willing to develop relationships with Agency program managers.

Proposal Assessment - Defining Content

1. Define your “hard targets” of opportunity based on:

- SMU's faculty expertise and available tools;
- Consistency with customer agency's mission/research priorities (ensure PI/Center Director/Dean formulated proposal based on agency priorities before proceeding); and
- If the proposal/idea has an Agency Champion.

2. **Facts:** Gather your facts to justify a new or augmented investment and demonstrate you understand the need(s).

3. **Outcomes:** Can we define specific outcomes we seek that addresses the needs we identified?

4. **Cost:** Provide clear budgetary requirements and determine if the cost is shared with other partners, and how.

5. **Use “Layman’s Terms”:** Papers must be written so those not trained in science can understand our requests quickly and easily. Recycled, failed old peer review proposals are a non-starter.



Proposal Mechanics

We can help support, vet, and shape your ideas...

- Supplementary research on how an idea matches a federal priority and previous funded examples;
- Provide data on agency funding trends and shifting research priorities, as well as creative thinking on aligning ideas to meet agency objectives;
- Research on types of grant and contract mechanisms used by federal agencies;
- Assist in getting political support (letters & calls) for large proposals to agencies;
- Find prior year precedents of Congressional action (though past performance is no guarantee); and
- Candid assessment of probable agency, Congressional delegation and/or committee interest.

Proposal Development – Importance of Partners in Research (and Advocacy)

More “bang for the buck” if your delegation can support/fund joint SMU requests with other partners in the State:

- Texas Industrial Juggernauts:
 - Defense/Space;
 - Energy (Production and distribution, leader in wind);
 - Technology (Software and telecoms);
 - Transportation;
- Small Businesses:
 - Emerging companies in fields like medical counter-measures, materials, cryptocurrency/mining, 3D printing/metal fabrication...
- Economic workforce significance to the State? Jobs, jobs, jobs
- Community Services: Health care providers, K-12 education, underserved populations, etc...



Proposal Development – Importance of Partners in Research (and Advocacy) (cont.)

Due to Texas' structural weakness in the Senate, it is also helpful to consider how you can join forces with universities in other states:

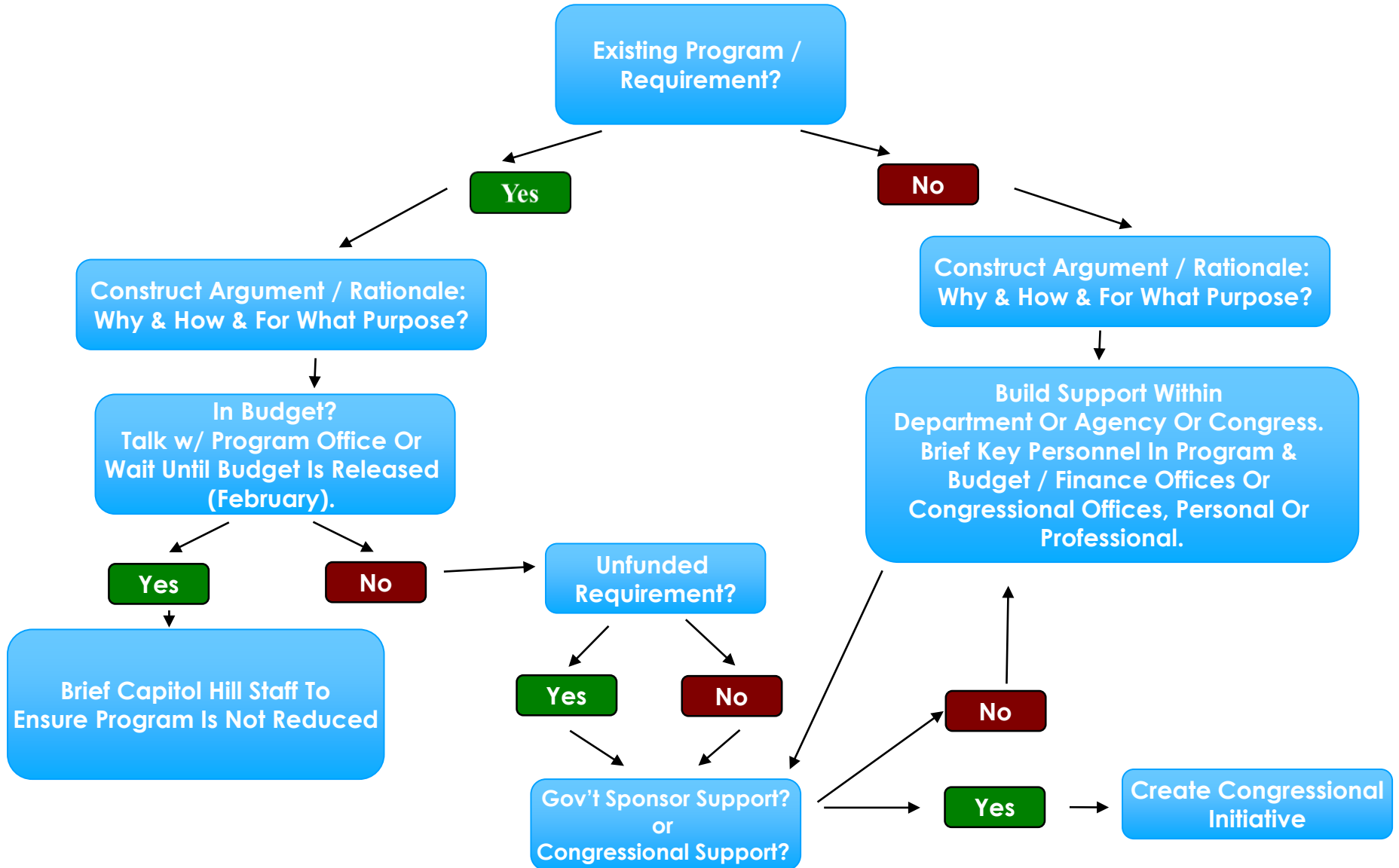
- Alabama, Louisiana, Mississippi:
 - Coastal Resilience/Remote Sensing; Mapping; Emissions-sensing; Gulf Coast Consortium...

Looking to FY24:

- New Hampshire/Kansas: CJS
- Montana/Maine: Defense



Congressional Initiative Decision Making Flow Chart SMU



The Return of Earmarks

- **New and improved.** House and Senate Appropriations Committees have “resurrected” the practice, with limits:
 - Only non-profits and state/local governments are eligible.
 - Only certain agencies and accounts are eligible.
 - House Members especially constrained given 15 total request limit.
- **Here today....**If Republicans take control of the House and/or Senate in the 2022 midterm elections, earmarks may suddenly go away again...
- **Capacity building, not sustainment.** Earmarks can be useful for a “one-time investment” to help build capacity and/or purchase needed equipment or facilities (in limited cases), but are poorly suited as a source of ongoing support for university research efforts.
- **High visibility possible.** Advantage of accessing federal funding outside of the existing competitive processes, but may also invite additional scrutiny (from media) as a result.
- **Community links matter.** Requests that provide improved services to citizens may improve chances of securing an earmark, and partnering with local community organizations on such requests may also help (certainly with the House).
- **Not just about research value.** Proposed earmarks for equipment need strong tie-in to societal benefit/applied R&D, rather than just basic R&D.



Final Observations and Thoughts....

- Prepare potential federal ideas and initiatives early, draft concept white papers following the suggested format;
- Timing is always of the essence. Follow the deadlines and do not try and go “around” the successful established process;
- Earmarks – useful for one-time investments/needs, in other cases they require broader community support beyond just the University to meet the eligibility rules set by Congress.
- Congress flipping will restrain both federal spending and “art of possible” on Hill, but massive R&D investments from 117th Congress will not be repealed;
- For opportunities outside of “normal” annual process and standing grants (aka reconciliation/CHIPS), prepare concept papers in addition to white papers for agency PM meetings.
- Lastly, remember that any conversations you have with Congressional offices, particularly related to federal funding, must always be coordinated with the Office of Research.

Questions, Answers and Discussion Session

