

Balancing Research Security with Delivering New Capabilities at Speed: Tips and Tools

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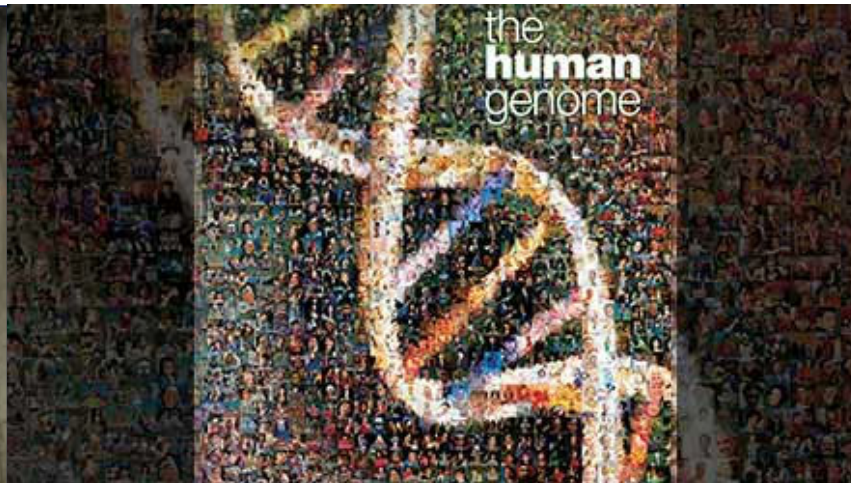
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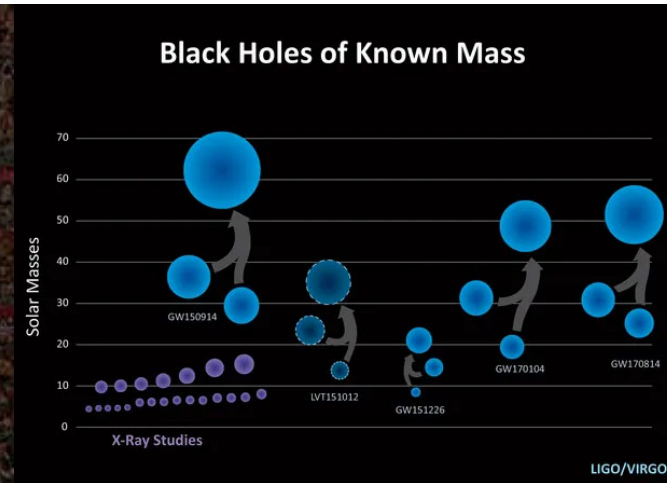
International Scientific Collaboration Can Move Forward the State of Knowledge



European Organization for Nuclear Research (CERN)



International Human Genome Sequencing Consortium



Laser Interferometer Gravitational-Wave Observatory (LIGO)

... but high value research is a high value target for exploitation and unwanted technology transfer



Exploitation Efforts by Strategic Competitors

Despite the value of collaboration, there are numerous efforts by foreign governments/entities to obtain technology

- Russia “is targeting United States technology through the employment of a variety of licit and illicit technology transfer mechanisms to support national-level efforts....”*
- The People’s Republic of China is “targeting sources of United States and allied strength by employing means that include stealing technology ... [and] ... failing to provide reciprocal access in research and development (R&D) projects”*



- “Our competitors are equally aware of the strength of our innovation ecosystem and are actively attempting to acquire technologies from the United States through licit and illicit means.”#

Implementation Assumptions:

- ***Running fast is essential but insufficient to maintain military advantage***
- ***We cannot protect everything so must prioritize the things to protect***
- ***We must creatively adapt to our challenges and shape our opportunities***

Ruopeg Liu and Kuang-Chi Group^

- **2006-** Duke PI published prototype of “invisibility cloak” to conceal objects from microwave detection (Air Force Office of Scientific Research funded)
- **2006-2009-** Ruopeg Liu joined the lab as a PhD student; collaboration initiated with a Chinese research lab, co-published new & improved version
 - Unknown to Duke faculty, Liu allegedly began sending intellectual property and research information to the Chinese lab
 - FBI never charged Liu
- **2010-today-** Liu returned to China; founded and is as President of Kuang-Chi Group, a multi-billion dollar conglomerate
- **2015-2020-** Kuang-Chi Group engaging in behaviors contrary to US foreign policy interests, resulting in Entity Listing

SOURCES:
 * National Strategy for Critical And Emerging Technologies- October 2020
 # National Defense Science and Technology Strategy- May 2023
 ^<https://www.dukechronicle.com/article/2017/10/how-one-graduate-student-allegedly-stole-duke-research-to-create-a-billion-dollar-chinese-company>

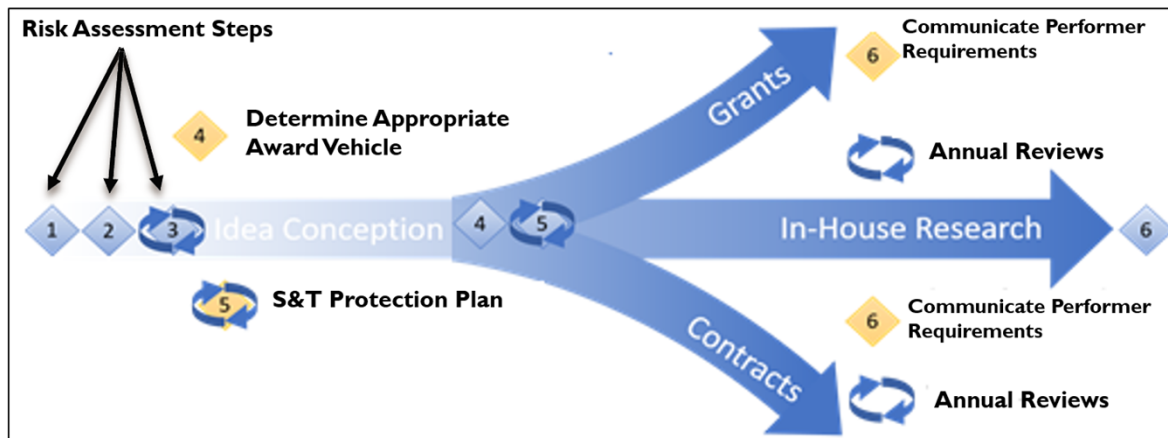


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Due Diligence Risk Reviews: Balancing Costs and Benefits for DoD R&D

Due diligence is required to minimize exploitation of DoD funded Research and Development (R&D)



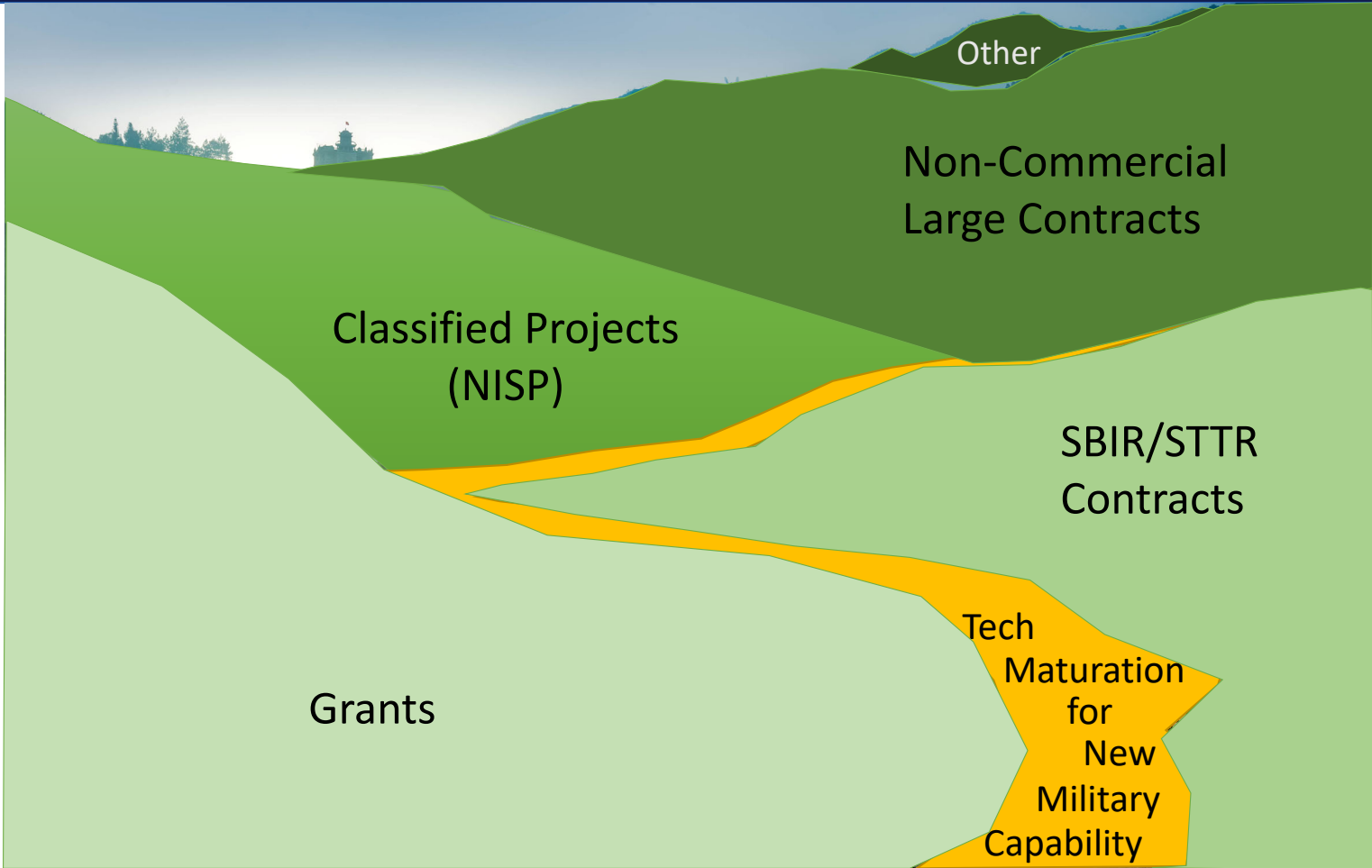
<https://www.cto.mil/news/sci-tech-protection-course/>

Strike balance between protection efforts and technology advancement to maintain leadership and technology superiority

Due Diligence is defined as an investigation, audit, or review performed to confirm the facts of a matter under consideration DoDI 2000.25, December 2021, page 39.



Due Diligence Risk Reviews to Cover the Landscape of DoD R&D



FY20 NDAA
Public Law 116-92,
Section 847

SBIR and STTR
Extension Act of
2022
Public Law 117-183

Executive
Order 12829
(1993)
32 CFR Part 117

NSPM 33
(2021)
and paired
Guidance
(2022)



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Support for Technology Protection

Executive and Legislative Direction

Presidential Memorandum on United States Government-Supported Research and Development National Security Policy

Public Law 117-187 117th Congress

CHIPS and Science Act – Research Security Section 10632

DoD Policy

DoD Directive 5000.83

TECHNOLOGY AND FINANCIAL PROTECTION TO SUSTAIN ECONOMIC ADVANTAGE

Issuance: 14-07-2023

Effective: 14-07-2023

Replaces and Cancels: DoD Directive 5000.82

DoDI 5000.83 – July 2020

Guidance

TAPPs

Technology Area Protection Plans – 2020-2023

S&T Protection Guide

Published July 2021

Templates and Tools

Table 1. Decision Matrix to Inform Fundamental Research Proposal Mitigation Decisions

Factors for Assessment of Critical Individual's Association, Collaboration, Funding, and the Policies of the Proposing Institution that Impact the Critical Individual

Proposed Action	Factor 1: Critical Individual's Association	Factor 2: Critical Individual's Collaboration	Factor 3: Critical Individual's Funding	Factor 4: Critical Individual's Policies
Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work
Factor 1: Critical Individual's Association	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work
Factor 2: Critical Individual's Collaboration	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work
Factor 3: Critical Individual's Funding	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work
Factor 4: Critical Individual's Policies	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work	Indefinite suspension of work

Decision Matrix to Inform Fundamental Research Proposal Mitigation Decisions

Education and Training

NSRF Research Security Training Collection for Site NSRF 23-076

Task 1: What is Research Security? Task 2: Disclosure

Task 3: Manage and Manage Risk Task 4: International Collaboration

Research Security Training Materials in development by National Science Foundation

DAU

2020 Fundamentals of Science and Technology Protection

Public Law 117-183 117th Congress

SBIR and STTR Extension Act of 2022

Public Law 117-183 117th Congress

SBIR and STTR Extension Act of 2022

USD(R&E) Memo on Fundamental Research Risk Review- June 2023

S&T Protection Guide

Published July 2021

Section 1286 List of Institutions of Concern

S&T Protection Plan Template

Fundamentals of Science and Technology Protection Course

January 2023

PROJECT SPECTRUM

Online Courses

Foreign Influence Course for Small Businesses





Protection Appropriate to the Maturity of the Technology

Examples of Notional Technology Protection Levers Employed Across the Technology Readiness Level (TRL) Lifecycle

*Document includes material developed in partnership with UK MOD

DoD S&T

Development

Technology Protection Activity Mapping

Fundamental Research (NSDD 189)

Advanced Technology Develop

Demonstration/Validation thru Operational Test and Evaluation

Basic Research

Applied Research

TRL 1

TRL 2

TRL 3

TRL 4

TRL 5

TRL 6

TRL 7

TRL 8

TRL 9+

Outreach Campaigns	Government engagement to raise awareness in academia and industry of security threats to their R&D. International engagement with allies and partners to share intelligence, experience and lessons identified.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Research Security	Comprehensive administrative and technical security measures and foreign influence reviews to access risk and ensure integrity of research enterprise.	✓	✓	✓	✓	✓				
Research Licenses	Foreign postgraduates must obtain a visa to study STEM subjects in the US. Potential motives for research are assessed against the applicant's profile.	✓	✓	✓						
Patent Security Reviews	Patent applications for technology areas of interest are flagged to DoD by the Patent Office. DoD is able to intervene and classify for national security purposes.			✓	✓	✓	✓	✓	✓	✓
Export Controls	Compliance with the U.S.'s international legal obligations to prevent the proliferation of military and dual use technologies by obliging exporters to obtain a license to trade products listed in the international conventions.			✓	✓	✓	✓	✓	✓	✓
Risk-Based Assessments of Foreign Investment	Market intervention due to anti-competitive and national security risk assessments. Supported by bolstered legal frameworks to identify and categorise technology fields of interest.			✓	✓	✓	✓	✓	✓	✓
Anti-Tamper	Through-life measures to assure U.S. technology is protected against reverse engineering or tampering by hostile entities.					✓	✓	✓	✓	✓
Cybersecurity	DoD requires adequate security per DFARS 252.204-7012 for protection of CUI on non-government networks that process or generate CUI. Information not cleared for public release but not CUI is governed by FAR 52.204-21, NSPM 33	✓	✓	✓	✓	✓	✓	✓	✓	✓

Multiple organizations, processes and authorities exist and are responsible for addressing unwanted tech transfer



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<https://rt.cto.mil/stpp/mta/>



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Fundamental research decision matrix considers four factors to determine whether mitigation measures are needed

- **Foreign talent recruitment programs** – a way a Foreign Country of Concern (FCOC) corrupts the open research enterprise by conducting secretive dealings between recipients and the FCOC, including transfer of knowledge and personnel outside of norms
- **Funding sources** – accepting funding from FCOCs may create an obligation to that FCOC that conflicts with USG goals for funded research effort
- **Conflicting Patents** – patents arising from US-funded research filed in a foreign country before being filed in the U.S. can be an indicator of undisclosed agreements with a foreign country.
- **Entity lists** – problematic actors that affiliation or association with could create a conflict of interest or conflict of commitment

Table 1: Decision Matrix to Inform Fundamental Research Proposal Mitigation Decisions
 Factors for Assessing a Covered Individual's Associations, Affiliations, Collaborations, Funding, and the Policies of the Proposing Institution that Employs the Covered Individual

	Factor 1: Foreign Talent Recruitment Programs	Factor 2: Funding Sources	Factor 3: Patents	Factor 4: Entity Lists
Prohibited factors	For the period after 9 Aug 2024 Indicators of participation in a multi-foreign talent recruitment program (MFRTP) meeting any of the criteria in Sec. 11628(a)(4)(A)(i) of the CHIPS and Science Act of 2022. Policy of Proposing Institution employing the covered individual does not prohibit participation in a MFRTP.			
Factors discouraged by DoD policy, mitigation measures required, rejection of proposal required if no mitigation possible	For the period after 9 Aug 2022: Indicator(s) of participation in a foreign talent recruitment program (FTRP) meeting any of the criteria in Sec. 11628(a)(4)(A)(i) of the CHIPS and Science Act of 2022.	Indicator(s) that the covered individual is currently receiving funding from a Foreign Country of Concern (FCOC) or a FCOC-connected entity.	Patent application(s) or patent(s) not disclosed in proposal that resulted from research funded by the U.S. Government (USG), that were filed in an FCOC prior to filing in the U.S. or filed on behalf of an FCOC-connected entity.	For the period after 9 Aug 2022: Indicator(s) of association with an entity on the U.S. BIS Entity List, the Annex of EO 14027 or superseding EO, Sec. 12605 of the National Defense Authorization Act (NDAA) for FY 2021, or Sec. 1286 of the NDAA for FY 2019, as amended. For the period after 10 Oct 2019: Indicator(s) of affiliation with an entity on the U.S. BIS Entity List, the Annex of EO 14027 or superseding EO, Sec. 12605 of the NDAA for FY 2021, or Sec. 1286 of the NDAA for FY 2019, as amended.
Mitigation measures recommended	For the period between 10 Oct 2019 and 9 Aug 2022: Indicator(s) of participation in an FTRP meeting any of the criteria in Sec. 11628(a)(4)(A)(i) of the CHIPS and Science Act of 2022.	For the period between 10 Oct 2019 and 9 Aug 2022: Indicator(s) that the covered individual received funding from a FCOC or an FCOC-connected entity.	Patent application(s) or patent(s) disclosed in proposal, resulting from research funded by the USG, that were filed in an FCOC prior to filing in the U.S. or on behalf of an FCOC-connected entity.	For the period between 10 Oct 2019 and 9 Aug 2022: Indicator(s) of association with an entity on the U.S. BIS Entity List, the Annex of EO 14027 or superseding EO, Sec. 12605 of the NDAA for FY 2021, or Sec. 1286 of the NDAA for FY 2019, as amended.

<https://media.defense.gov/2023/Jun/29/2003251160/-1-1/1/COUNTERING-UNWANTED-INFLUENCE-IN-DEPARTMENT-FUNDED-RESEARCH-AT-INSTITUTIONS-OF-HIGHER-EDUCATION.PDF>

- Affiliation = Academic (not including undergraduate or graduate students), professional, or institutional appointments or positions with a foreign government or a foreign government-connected entity, whether fulltime, part-time, or voluntary (including adjunct, visiting, post-doctoral appointment, or honorary), **where monetary reward, non-monetary reward, or other quid-pro-quo obligation is involved.**
- Association = Academic (not including undergraduate or graduate students), professional, or institutional appointments or positions (including adjunct, visiting, voluntary, post-doctoral appointment, or honorary) with a foreign government or a foreign government-connected entity **where no monetary reward, non-monetary reward, or other quid-pro-quo is involved.**



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FY22 Lists Published in Response to Section 1286 of Public Law 115-232, as amended

- The 1286 List includes foreign institutions that have been confirmed as engaging in problematic activity as described in Section 1286(c)(8)(A) of the NDAA for FY 2019, as amended. It also identifies the foreign talent programs that have been confirmed as posing a threat to the national security interests of the United States as described in Section 1286(c)(9)(A) of the NDAA for FY 2019, as amended.

- Table 1: List of Institutions of the People’s Republic of China, Russian Federation, and other Countries with Specific Characteristics
- Table 2: Foreign Talent Programs that Pose a Threat to National Security Interests of the United States

- Documentation on problematic behaviors engaged in by the institutions on the 1286 list can be found in USG published sources

- Entities List
- Justice Department Court Cases

Academy of Military Medical Sciences (AMMS)	
Academy of Military Medical Sciences, Field Blood Transfusion Institution	
Academy of Military Medical Sciences, Institute of Basic Medicine	
Academy of Military Medical Sciences, Institute of Bioengineering	
Academy of Military Medical Sciences, Institute of Disease Control and Prevention a.k.a. Disease Control and Prevention Institute	
Academy of Military Medical Sciences, Institute of Health Service and Medical Information	
Chinese Academy of Engineering Physics (CAEP) a.k.a. Ninth Academy	Environmental Medicine
Southwest Computing Center	Department of
Southwest Institute of Applied Electronics	of Epidemiology a.k.a.
Southwest Institute of Chemical Materials	Southwest Institute of
Southwest Institute of Electronic Engineering	of Radiation Medicine a.k.a.
Southwest Institute of Environmental Testing	Southwest Institute of
Southwest Institute of Explosives and Chemical Engineering	of the
Southwest Institute of Fluid Physics	and Pharmacology a.k.a.
Southwest Institute of General Designing and Assembly	
Moscow Order of the Red Banner of Labor Research Radio Engineering Institute JSC a.k.a. MNIRTI JSC	Environmental Medicine
Nanjing University of Aeronautics and Astronautics	Department of
Nanjing University of Science and Technology	of Epidemiology a.k.a.
National University of Defense Technology (NUDT) a.k.a. Central South CAD Center	Southwest Institute of
CSCC	of Radiation Medicine a.k.a.
Hunan Guofang Keji University	Southwest Institute of
Northwestern Polytechnical University a.k.a. Northwestern Polytechnic University	of the
Northwest Polytechnic University	and Pharmacology a.k.a.
Northwest Polytechnical University	Research Institute
Ocean University of China	of (BAMTRI) a.k.a. e 625
Rubanov Institute of Semiconductor Physics, Siberian Branch of Russian Academy of Sciences a.k.a. IPP SB RAS	
Institute of Semiconductor Physics IM A.V. Rubanov	
Sichuan University	
Sun Yat-Sen University	
Tactical Missile Corporation, Concern "MPO-Gidropribor" a.k.a. Joint Stock Company Concern Sea Underwater Weapons Gidropribor	China Academy of
Research Institute "Gidropribor"	Materials Factory
Tactical Missile Corporation, Joint Stock Company GosNIMMash a.k.a. PPORosprofgrom V-GOSNIMASHI	ics, Beijing
State Research Institute of Mechanical Engineering	
Pervichnaya Professorskaya Organizatsiya Rossiyskogo Profsoyuznaya Rabotnikov Promyshlennosti V	of the Ministry of Science
"GOSNIMASHI"	
Joint Stock Company "State Research Institute of Mechanical Engineering" named after "V.V. Bakhtev"	
SKB DNKKhTI	
	search (HPSTAR) a.k.a.

Changjiang Scholar Distinguished Professorship
Hundred Talents Plan
Pearl River Talent Program
Project 5-100
River Talents Plan
Thousand Talents Plan
Any program that meets one of the criteria contained in Section 10638 (4)(A) and either Section 10638 (4)(B)(i) or (ii) in the CHIPS and Science Act