

## Application Results for 2022 Academia Sinica TYPE I & II Grants

A total of 123 applications were submitted for the 2022 Academia Sinica Type I and Type II grants: 38 from the Division of Mathematics and Physical Sciences; 63 from the Division of Life Sciences; 22 from the Division of Humanities and Social Sciences. Of these, 46 were selected for funding, including 16 from Division of Mathematics and Physical Sciences, 21 from Division of Life Sciences, and 9 from Division of Humanities and Social Sciences. Please refer to the following lists for detailed information.

### 2022 Academia Sinica Career Development Award

A total of 26 applications were submitted for the 2022 Career Development Award: 8 from the Division of Mathematics and Physical Sciences; 16 from the Division of Life Sciences; 2 from the Division of Humanities and Social Sciences. Of these, 13 were awarded, including 5 from the Division of Mathematics and Physical Sciences, 7 from the Division of Life Sciences and 1 from the Division of Humanities and Social Sciences.

#### A. Division of Mathematics and Physical Sciences: (5 Projects)

Project No.	Project Title	Project PI	Affiliation
AS-CDA-111-M01	High-resolution probing of earthquake and landquake slip zone process with fiber-optic sensing: A cross-scale field experiment and viewpoint	Hsin-Hua Huang	Institute of Earth Sciences, Academia Sinica
AS-CDA-111-M02	Quantum Electrodynamics Chemistry: Exploring the Chemical Properties of Light-Molecule Hybrid States	Liang-Yan Hsu	Institute of Atomic and Molecular Sciences, Academia Sinica
AS-CDA-111-M03	What physical mechanisms cause the diversity of star and planet formation?	Hsi-Wei Yen	Institute of Astronomy and Astrophysics, Academia Sinica
AS-CDA-111-M04	Illuminating the Physics of Superluminous Supernovae	Ke-Jung Chen	Institute of Astronomy and Astrophysics, Academia Sinica
AS-CDA-111-M05	Supervised Projection for Massive Data: Theory and Applications	Ming-Chung Chang	Institute of Statistical Science, Academia Sinica

#### B. Division of Life Sciences : ( 7 Projects )

Project No.	Project Title	Project PI	Affiliation
AS-CDA-111-L01	Study epidermal cell lineage progression and its response to environmental stresses in Arabidopsis leaves	Chin-Min Kimmy Ho	Institute of Plant and Microbial Biology, Academia Sinica

AS-CDA-111-L02	In vivo analysis of dendritic mitochondria function in experience-dependent sensory circuit remodeling	Shu-Ling Chiu	Institute of Cellular and Organismic Biology, Academia Sinica
AS-CDA-111-L03	Structural and mechanistic investigation of GABAergic receptors in the native environment by state-of-the-art mass spectrometry	Hsin-Yung Yen	Institute of Biological Chemistry, Academia Sinica
AS-CDA-111-L04	Neural encoding of prediction during social conditioning	Kuo-Hua Huang	Institute of Molecular Biology, Academia Sinica
AS-CDA-111-L05	Understanding the mechanisms of the root meristem size control and abiotic stress tolerance by Root meristem Growth Factor 1 (RGF1) peptide.	Masashi Yamada	Agricultural Biotechnology Research Center, Academia Sinica
AS-CDA-111-L06	Unveil the functions and recognition mechanisms of non-canonical open-reading frames for plant defense	Ming-Jung Liu	Agricultural Biotechnology Research Center, Academia Sinica
AS-CDA-111-L07	Uncovering the ecological and evolutionary processes shaping the diversity of avian nests	Mao-Ning Tuanmu	Biodiversity Research Center, Academia Sinica

C. Division of Humanities and Social Sciences: (1 Project)

<b>Project No.</b>	<b>Project Title</b>	<b>Project PI</b>	<b>Affiliation</b>
AS-CDA-111-H01	The Chinese Anti-Bureaucratic Discourse and Political Culture in Twentieth Century China	Shiuon Chu	Institute of Modern History, Academia Sinica

## 2022 Academia Sinica Investigator Award

A total of 35 applications were submitted for the 2022 Academia Sinica Investigator Award: 9 from the Division of Mathematics and Physical Sciences; 17 from the Division of Life Sciences; 9 from the Division of Humanities and Social Sciences. Of these, 13 were awarded, including 3 from the Division of Mathematics and Physical Sciences, 6 from the Division of Life Sciences and 4 from the Division of Humanities and Social Sciences.

### A. Division of Mathematics and Physical Sciences: (3 Projects)

Project No.	Project Title	Project PI	Affiliation
AS-IA-111-M01	Processing-in-Memory: Opportunities in the Post-von-Neumann Era	Yuan-Hao Chang	Institute of Information Science, Academia Sinica
AS-IA-111-M02	High pressure-temperature thermal conductivity and sound velocity of ultralow velocity zones: implications for the complex thermo-chemical structures and dynamics at the core-mantle boundary	Wen-Pin Hsieh	Institute of Earth Sciences, Academia Sinica
AS-IA-111-M03	The Structure of a 3-Manifold Invariant	Miranda Chih-Ning Cheng	Institute of Mathematics, Academia Sinica

### B. Division of Life Sciences : (6 Projects)

Project No.	Project Title	Project PI	Affiliation
AS-IA-111-L01	Synaptic and circuit mechanisms of sex-biased social defects in autism mouse models	Yi-Ping Hsueh	Institute of Molecular Biology, Academia Sinica
AS-IA-111-L02	Molecular mechanism of prey-sensing, trap morphogenesis and evolution in nematode-trapping fungi	Yen-Ping Hsueh	Institute of Molecular Biology, Academia Sinica
AS-IA-111-L03	Sensing of and adaptations to environmental pH in plants	Wolfgang Schmidt	Institute of Plant and Microbial Biology, Academia Sinica
AS-IA-111-L04	Deciphering the Evolution of Diverse Animal Forms with Deep Learning	Sheng-Feng Shen	Biodiversity Research Center, Academia Sinica
AS-IA-111-L05	Mechanisms and Functions of Histone N- $\alpha$ -acetylation in Epigenetics, Development and Disease	Li-Jung Juan	Genomics Research Center, Academia Sinica
AS-IA-111-L06	Molecular and neurobiological basis of opioid-independent peripheral analgesia for intractable pain	Chih-Cheng Chen	Institute of Biomedical Sciences, Academia Sinica

C. Division of Humanities and Social Sciences: (4 Projects)

Project No.	Project Title	Project PI	Affiliation
AS-IA-111-H01	Politics and Justice in a Nascent Democracy: Empirical Studies of Taiwan	Chung-Li Wu	Institute of Political Science, Academia Sinica
AS-IA-111-H02	A Comprehensive Study of Legal Families, Legal System and Comparative Law: Toward a System-oriented and Contextual Legal Thinking	Chien-Liang Lee	Institutum Iurisprudentiae, Academia Sinica
AS-IA-111-H03	Why States Violated International Human Rights Treaties: Review of Individual Communications	Fort Fu-Te Liao	Institutum Iurisprudentiae, Academia Sinica
AS-IA-111-H04	The EU Vaccine Strategy and the Regulation of Compulsory License: Implications for Taiwan	Der-Chin Horng	Institute of European and American Studies, Academia Sinica

**2022 Academia Sinica Thematic Research Program**

A total of 32 applications were submitted for the 2022 Thematic Research Program: 12 from the Division of Mathematics and Physical Sciences; 13 from the Division of Life Sciences; 7 from the Division of Humanities and Social Sciences. Of these, 10 were awarded, including 5 from the Division of Mathematics and Physical Sciences, 3 from the Division of Life Sciences and 2 from the Division of Humanities and Social Sciences. 2 applications from the Division of Mathematics and Physical Sciences were reassigned to the Grand Challenge Program for execution.

A. Division of Mathematics and Physical Sciences: (3 Projects)

Project No.	Project Title	(1) Project PI (2) Project Co-PI	Affiliation
AS-TP-111-M01	AI Algorithm Analysis for Factors Governing Glycosylation Reactions	(1) Cheng-Chung Wang	Institute of Chemistry, Academia Sinica
AS-TP-111-M02	Understanding and generation of audio-visual multimedia content with deep learning	(1) Li Su (2) Jen-Chun Lin	Institute of Information Science, Academia Sinica Institute of Information Science, Academia Sinica
AS-TP-111-M03	Energy and momentum evolution of correlated electronic quantum states in optically excited solids: from transient excitons to image potential states	(1) Cheng-Tien Chiang	Institute of Atomic and Molecular Sciences, Academia Sinica

B. Division of Life Sciences : ( 3 Projects )

<b>Project No.</b>	<b>Project Title</b>	<b>(1) Project PI (2) Project Co-PI</b>	<b>Affiliation</b>
AS-TP-111-L01	Deciphering the underlying molecular mechanism of the PR-1 like protein in <i>Ustilago maydis</i> virulence	(1) Lay-Sun Ma  (2) Yin-Ru Chiang  (2) Chuan-Chih Hsu	Institute of Plant and Microbial Biology, Academia Sinica Biodiversity Research Center, Academia Sinica Institute of Plant and Microbial Biology, Academia Sinica
AS-TP-111-L02	Structural impact of phosphorylated nitrate transport NRT1.1 and its interaction with associated proteins	(1) Chwan-Deng Hsiao	Institute of Molecular Biology, Academia Sinica
AS-TP-111-L03	Understanding the behavior and response in corals in the era of changing climate: integrative approaches from ecology to genomics	(1) Chaolun Allen Chen  (2) Jih-Terng Wang  (2) Mei-Fang Lin  (2) Sung-Yin Yang	Biodiversity Research Center, Academia Sinica Department of Oceanography, National Sun Yat-sen University Department of Marine Biotechnology and Resources, National Sun Yat-sen University National Museum of Marine Biology and Aquarium

C. Division of Humanities and Social Sciences: (2 Projects)

<b>Project No.</b>	<b>Project Title</b>	<b>(1) Project PI (2) Project Co-PI</b>	<b>Affiliation</b>
AS-TP-111-H01	The rejoining, verification and research of Oracle Bones included in the “Archaeological Data Digital Collection Database” of “Institute of History and Philology, Academia Sinica”	(1) Shih-Hsuan Yen  (2) Hung-Ming Lin	Institute of History and Philology, Academia Sinica Department of Chinese Literature, National Chengchi University
AS-TP-111-H02	Health for All? The Coronavirus Pandemic and the State Governance of Bionationalism in Taiwan	(1) Yu-Yueh Tsai	Institute of Sociology, Academia Sinica

## 2022 Academia Sinica Grand Challenge Program

A total of 30 applications were submitted for the 2022 Grand Challenge Program: 9 from the Division of Mathematics and Physical Sciences; 17 from the Division of Life Sciences; 4 from the Division of Humanities and Social Sciences. Of these, 10 were awarded, including 3 from the Division of Mathematics and Physical Sciences, 5 from the Division of Life Sciences and 2 from the Division of Humanities and Social Sciences. In addition, 2 Thematic Research Program applications from the Division of Mathematics and Physical Sciences were reassigned to this program for execution.

### A. Division of Mathematics and Physical Sciences: (5 Projects)

Project No.	Project Title	(1) Project PI (2) Project Co-PI	Affiliation	Grant Period
AS-GC-111-M01	Ubiquitous Assistive Oral Communication Technologies	(1) Yu Tsao  (2) Hsiao-Lan Sharon Wang  (2) Li-Chin Chen  (2) Chao-Min Wu	Research Center for Information Technology Innovation, Academia Sinica Department of Special Education, National Taiwan Normal University Research Center for Information Technology Innovation, Academia Sinica Department of Electrical Engineering, National Central University	4+1
AS-GC-111-M02	A synthetic protein-enabled digital chemical recognition system	(1) Pei-Kuen Wei  (2) Jung-Hsin Lin  (2) Hsu-Yi Hsieh	Research Center for Applied Sciences, Academia Sinica Research Center for Applied Sciences, Academia Sinica Research Center for Applied Sciences, Academia Sinica	3+2
AS-GC-111-M03	Decode and Modulate the Sweet Tumor Microenvironment by Micro-to-single Cell Multi-proteomics Station and Targeting Materials	(1) Yu-Ju Chen  (2) Hsiung-Lin Tu  (2) Kuo-I Lin  (2) Takashi Angata  (2) Chun-Cheng Lin	Institute of Chemistry, Academia Sinica Institute of Chemistry, Academia Sinica Genomics Research Center, Academia Sinica Institute of Biological Chemistry, Academia Sinica Department of Chemistry, National Tsing Hua University	2+3

AS-GC-111-M04	Reinvigorating Carbon and Main Group Features with Non-Octet Strategy for Sustainable Catalysis	(1) Tiow-Gan Ong	Institute of Chemistry, Academia Sinica	3+2
AS-GC-111-M05	Functionalization and Assembly of Molecular Nanocarbons for Bioengineering	(1) Hsiao-Hua Yu (2) Kenichiro Itami (2) Hsien-Ming Lee (2) Peilin Chen (2) Shyh-Chyang Luo (2) Yu-Sheng Hsiao	Institute of Chemistry, Academia Sinica Institute of Chemistry, Academia Sinica Institute of Chemistry, Academia Sinica Research Center for Applied Sciences, Academia Sinica Department of Materials Science and Engineering, National Taiwan University Department of Materials Science and Engineering, National Taiwan University of Science and Technology	3+2

**B. Division of Life Sciences : ( 5 Projects )**

<b>Project No.</b>	<b>Project Title</b>	<b>(1) Project PI (2) Project Co-PI</b>	<b>Affiliation</b>	<b>Grant Period</b>
AS-GC-111-L01	Towards an integrated understanding of metamorphosis in bilaterians	(1) Jr-Kai Yu (2) Vincent Laudet (2) Yi-Hsien Su (2) Stephan Schneider	Institute of Cellular and Organismic Biology, Academia Sinica Institute of Cellular and Organismic Biology, Academia Sinica Institute of Cellular and Organismic Biology, Academia Sinica Institute of Cellular and Organismic Biology	4+1
AS-GC-111-L02	Knowledge-based development of an integration-free genome editing platform based on Agrobacterium-mediated transformation by floral-inoculation	(1) Erh-Min Lai (2) Chih-Horng Kuo (2) Chih-Hang Wu	Institute of Plant and Microbial Biology, Academia Sinica Institute of Plant and Microbial Biology, Academia Sinica Institute of Plant and Microbial Biology, Academia Sinica	2+3

AS-GC-111-L03	Mechanistic Studies to Elucidate Tau Transmission in Alzheimer's Disease	(1) Yun-Ru Chen (2) Chern, Yijuang (2) Yung-Feng Liao (2) Yi-Shuian Huang (2) Hung-Chih Kuo (2) Yi-Chung Tung (2) Bi-Chang Chen	Genomics Research Center, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Cellular and Organismic Biology, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Cellular and Organismic Biology, Academia Sinica Research Center for Applied Sciences, Academia Sinica Research Center for Applied Sciences, Academia Sinica	2
AS-GC-111-L04	Investigation of the pathogenic mechanism of CADASIL and potential therapeutic interventions	(1) Yi-Shuian Huang (2) Cheng-Ting Chien (2) Ruey-Bing Yang (2) Sung-Chun Tang (2) Dennis W Hwang	Institute of Biomedical Sciences, Academia Sinica Institute of Molecular Biology, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Department. of Neurology, School of Medicine, National Taiwan University Institute of Biomedical Sciences, Academia Sinica	2
AS-GC-111-L05	The Stochastic Storm in the Brain	(1) Ya-Hui Chou (2) Wen-Liang Hwang (2) Su-Yun Huang	Institute of Cellular and Organismic Biology, Academia Sinica Institute of Information Science, Academia Sinica Institute of Statistical Science, Academia Sinica	1

C. Division of Humanities and Social Sciences: (2 Projects)

Project No.	Project Title	(1) Project PI (2) Project Co-PI	Affiliation	Grant Period
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AS-GC-111-H01	Constructing Social Surveys under the Totalitarian Regime in Contemporary China	(1) Chih-Jou Jay Chen (2) Yuh-Jye Lee  (2) Jieh-Min Wu  (2) Thung-Hong Lin  (2) Yen-Sheng Chiang	Institute of Sociology, Academia Sinica Research Center for Information Technology Innovation, Academia Sinica Institute of Sociology, Academia Sinica Institute of Sociology, Academia Sinica Institute of Sociology, Academia Sinica	2+3
AS-GC-111-H02	The influence of norms on causality and responsibility, and the problem of free will: an investigation from the causal modelling perspective	(1) Peng-Hsiang Wang (2) Norman Y. Teng  (2) Linton Wang  (2) Duen-Ming Deng	Institutum Iurisprudentiae, Academia Sinica Institute of European and American Studies, Academia Sinica Department of Philosophy, National Chung Cheng University Department of Philosophy, National Taiwan University	2+3

## 2022 Grand Challenge Program Seed Grant

2 Career Development Award applications and 1 Investigator Award application were additionally funded as Grand Challenge Program seed grant upon applicant's consent.

### A. Division of Mathematics and Physical Sciences: (1 Project)

Project No.	Project Title	(1) Project PI (2) Project Co-PI	Affiliation	Grant Period
AS-GCS-111-M01	Nonlinear light-matter interaction of Weyl semimetals	(1) Yu-Chieh Wen	Institute of Physics, Academia Sinica	2

### B. Division of Life Sciences : ( 2 Projects )

Project No.	Project Title	(1) Project PI (2) Project Co-PI	Affiliation	Grant Period
AS-GCS-111-L01	Deciphering the effects of circadian disruption and the functions of core clock gene BMAL1 and BMAL2 in epithelial ovarian cancer	(1) Wendy W. Hwang-Verslues	Genomics Research Center, Academia Sinica	2

AS-GCS-111-L02	Principles underlying precise organelle abundance control	(1) Wei-Yuan Yang	Institute of Biological Chemistry, Academia Sinica	2
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## 2021 Grand Challenge Program 1+4 Project

One Grand Challenge Program Project funded for 1 year (2021) is funded for another 3+1 year upon successful competitive review based on progress report and revised proposal.

. Division of Life Sciences : ( 1 Project )

Project No.	Project Title	(1) Project PI (2) Project Co-PI	Affiliation	Grant Period
AS-GC-110-05	Investigate the immunosurveillance network in response to oxidative stress associated diseases using multiplexed single-cell technologies and its translational application multiplexed single-cell technologies and its translational application	(1) Shih-Yu Chen (2) Yijuang Chern (2) Ya-Jen Chang (2) Shih-Lei Lai (2) Chia-Wei Li (2) Tai-Ming Ko (2) Kai-Chien Yang	Institute of Biomedical Sciences , Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Biomedical Sciences, Academia Sinica Institute of Biomedical Sciences, Academia Sinica	3+1