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# AI SINGAPORE RESEARCH PROGRAMME

## AI SINGAPORE PhD FELLOWSHIP PROGRAMME 2021

### 1. About the Programme

- 1.1 The AI Singapore (AISG) Research Programme supports top Artificial Intelligence (AI) research talents in pursuing their PhD in Singapore-based Autonomous Universities (AUs)<sup>1</sup>.
- 1.2 The objective of the Programme is to nurture and train local AI talents to be able to perform advanced fundamental AI research and produce state-of-the-art AI algorithms, models and systems. Eventually, we hope that these talents will contribute to the other pillars of AI Singapore, the local AI eco-system and the society.
- 1.3 The AISG PhD Fellowship Programme welcomes all nationalities to apply. The AISG PhD fellows will be provided with a competitive stipend of up to S\$6,000 monthly, on top of other allowances and full tuition fees support up to four years of studies at Singapore-based AUs.
- 1.4 AISG PhD fellows are to publish novel and significant AI fundamental research publications at top-tier venues defined by AISG from the point of award until their PhD candidature period conclude. Additionally, AISG PhD fellows can look forward to participating in the initiatives from the other pillars of AISG such as 100Experiments, AI Makerspace, AI Grand Challenges and AI Technology Challenges.
- 1.5 Interested applicants or existing PhD candidates with strong interest in AI fundamental research are highly encouraged to apply for the AISG PhD Fellowship.

### 2. PhD Research Focus Areas

- 2.1 In the **AI Research PhD Fellowship Programme 2021 Call for Applications**, AI Singapore welcomes applicants/candidates who are interested in advanced fundamental AI research for the following themes:

- 2.2 **Theme One: Collaborative AI**

This theme centres on advancing the **state of the art in collaborative AI** and the following examples are sub-topics of interest:

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<sup>1</sup> *Autonomous Universities (AUs)*: National University of Singapore (NUS), Nanyang Technological University (NTU), Singapore Management University (SMU), Singapore University of Technology and Design (SUTD).



- i. Human-AI Collaboration or AI-AI Collaboration
- ii. Knowledge Representation
- iii. Transfer Learning

### 2.3 Theme Two: Trustworthy and Explainable AI

This theme centres on advancing the **state of the art in trustworthy or explainable AI** and the following examples are sub-topics of interest:

- i. Accountability in Intelligent Systems
- ii. Safe, Fair and Robust AI System Development
- iii. Transparent or Explainable AI System Development
- iv. Explainability and Trust (Safe, Fair, Robust) Assessment

### 2.4 Theme Three: Resource-Efficient AI

This theme centres on advancing the **state of the art in resource efficient AI** and the following examples are sub-topics of interest:

- i. Learning from Small Data Sets
- ii. AI Understanding of Design and Creation
- iii. Human AI Co-Design
- iv. Knowledge Representation with Complex Priors or Measurements

### 2.5 Theme Four: Privacy-Aware AI

This theme centres on advancing the **state of the art in privacy-aware AI** and the following examples are sub-topics of interest:

- i. Federated Learning
- ii. Privacy-Aware AI Algorithms

### 2.6 Theme Five: Continuous Learning AI

This theme centres on advancing the **state of the art in Continuous Learning AI** and the following examples are sub-topics of interest:

- i. Self-Supervised Learning
- ii. Lifelong Learning

2.7 Each proposed applicant/candidate is highly encouraged to **address one of the five themes listed above**. The applicants/candidates are **not limited to the proposed sub-topics**. Candidates are encouraged to have a clear research focus of a single theme instead of multiple themes.

2.8 Alternative themes **will only be considered for evaluation if he/she has exceptional**



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**credentials<sup>2</sup> and/or strong interest<sup>3</sup> in a particular AI fundamental research area.**

### **3. PhD Fellowship Details**

#### **3.1 Coverage and Post-Service Obligations**

3.1.1 The AISG PhD Fellowship Programme will support each AISG PhD fellow for a duration of up to four (4) years of studies:

- i. Full local tuition fees
- ii. Monthly sustenance allowance<sup>4</sup>  
For Singaporeans, it is up to \$6,000.  
For Singaporean Permanent Residents (PR), it is up to \$5,500.  
For other nationalities, it will be up to \$5,000.
- iii. CPF contribution<sup>5</sup> for Singaporeans only
- iv. Other allowances<sup>6</sup>: Computer, conference travels<sup>7</sup>, miscellaneous

3.1.2 A two (2) year service obligations in Singapore-based companies<sup>8</sup> will be required for international students who are non-Singaporeans or non-Singaporean PRs. If the PhD student is to obtain citizenship or Singapore's permanent residency during its fellowship supported period, the service obligations will be removed with effect based on the relevant supporting documents submitted to AISG.

3.1.3 The PhD fellows pursuing an AI-related PhD in Singapore-based AUs are eligible for funding under the AISG PhD Fellowship Programme after AISG evaluation. There is no funding support for:

- i. Applicants intending to pursue an AI-related PhD in overseas AUs or;
- ii. Candidates pursuing an AI-related PhD in overseas AUs.

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<sup>2</sup> A applicant/candidate with exceptional credentials has a track record of publishing in the top-tier AI conferences/journals as a main contributor (e.g., first author), strong academic track records (top 5% in his undergraduate and/or post-graduate studies) in a top-tier university, and/or impactful AI projects completed.

<sup>3</sup> Strong interest is defined as his/her research interest of an area explained through his/her research statement and past experiences in industry and/or academia.

<sup>4</sup> Monthly sustenance allowance and CPF contribution (only for Singaporeans) will be provided with effect from the date of obtaining Singapore citizenship or a Singapore Permanent Residency. Relevant supporting documents are required to facilitate the change of allowance rate and CPF (if applicable).

<sup>5</sup> Central Provident Fund (CPF) contributions shall be provided at a rate pegged to the prevailing employer's contribution rate set by CPF, which is on top of the monthly sustenance allowance.

<sup>6</sup> Other allowances are on a reimbursement basis of twice a year raised by the host institution and subjected to AI Singapore's cap rate.

<sup>7</sup> The conference travel support is subject to AU's prevailing travel guidelines and AI Singapore requirements on travel support.

<sup>8</sup> Singapore-based companies refer to local companies and international companies that has an office based in Singapore and registered with the Accounting & Corporate Regulatory Authority (ACRA)



### 3.1.4 Overview of differences across various candidates:

	Monthly Sustenance Allowance	CPF Contribution <sup>5</sup>	Service Obligations (post-graduation)
Singaporean	S\$ 6,000	Yes	NA
Singapore PR	S\$ 5,500	No	NA
International Student (without Singapore PR)	S\$ 5,000	NA	Yes (2 Years)

## 3.2 Deliverables from Awarded Fellows

3.2.1 From the point of award and until end of his/her candidature period, each AISG PhD fellow is expected to publish at least four (4) publications as the main/primary author of his/her publications. The four (4) publications are required to be in the main/technical track of the conferences or journals listed in AI Singapore's latest "Top 10% NRF Approved List" or "Clarivate's Science and Technology" list. The publications are required to acknowledge AISG as per AISG's guidelines in order for his/her publication to be recognised as a successful count.

3.2.2 All publications published by AISG PhD fellows are to be reported half-yearly basis from the point of award by AISG until their PhD candidature period conclude. Hence, in the event of AISG PhD fellow is to continue his/her fifth year and beyond (prior to the date of degree conferment) without the support of AISG, he/she is expected to acknowledge AISG his/her publications and inform AISG, (if any), until the date of degree conferment.

3.2.3 AISG PhD fellow will receive up to S\$5,000 travel grant support if he/she is the main/primary author of his/her paper in the top-tier list below. There is no restriction on the frequency of travel support for papers published in the top-tier list. This is to ensure Singapore's visibility and strong presence in top-tier AI conferences and to maintain Singapore's field-weighted citation impact.

3.2.4 The top-tier AI main/technical conferences suggested below is subject to annual revision by AI Singapore:

S/N	Acronym	Conference Title
1	AAAI	AAAI Conference on Artificial Intelligence
2	ACL	Annual Meeting of the Association for Computational Linguistics
3	CVPR	Conference on Computer Vision and Pattern Recognition
4	EMNLP	Conference on Empirical Methods in Natural Language Processing
5	ICCV	International Conference on Computer Vision
6	ICML	International Conference on Machine Learning
7	IJCAI	International Joint Conference on Artificial Intelligence
8	KDD	SIGKDD Conference on Knowledge Discovery and Data Mining
9	NeurIPS	Conference on Neural Information Processing Systems

3.2.5 For other AI conferences listed within the "Top 10% NRF Approved List", AISG PhD fellow will receive up to S\$2,000 travel grant support. The frequency of travel support is limited



to four (4) conferences throughout the award period. This travel grant support is applicable only if he/she is the main author of his/her paper.

### 3.3 Participation in AI Singapore’s Programme

3.3.1 The awarded AISG PhD fellows are required to participate in AI Singapore’s programme initiatives such as 100 Experiment Projects, AI Makerspace, AI Technology Challenges, Grand Challenges or other AI Singapore’s initiatives.

### 3.4 Transfer from Other Scholarships

3.4.1 Existing PhD candidates who fulfil the eligibility criteria mentioned in section 4.2 are welcomed to apply to AI Singapore’s PhD fellowship programme.

3.4.2 The budget provided to transfer PhD candidates are pro-rated accordingly from the full-support of 4 years PhD programme. There will not be any back-claiming of AISG PhD fellowship for the funds utilised prior to the award.

3.4.3 Successful AISG PhD fellows are still required to fulfil their previous scholarships’ pro-rated service obligations if applicable.

3.4.4 The deliverables required by AI Singapore will not be pro-rated from the date of transfer. Hence, transfer PhD candidates are still required to fulfil the deliverables as per section 3.2 and participate in AISG programmes as per section 3.3.

3.4.5 The awarded AISG PhD fellow must not be an existing scholarship holder at the start date of AISG PhD fellowship award indicated by AI Singapore.

3.4.6 The overview of the AISG PhD fellows’ support for transfer candidates:

<b>AISG PhD Fellowship Programme Intake</b>	<b>Existing PhD Candidates’ AU Admission Intake</b>	<b>AISG Support</b>
<b>January 2021</b>	August 2020	AISG support will commence from their 2 <sup>nd</sup> year studies (August 2021)
	January 2020	AISG support will commence from their 2 <sup>nd</sup> year studies (January 2021)
	August 2019	AISG support will commence from their 3 <sup>rd</sup> year studies (August 2021)
	January 2019	AISG support will commence their 3 <sup>rd</sup> year from (January 2021)
	January 2018 and August	Not eligible for transfer



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<b>AISG PhD Fellowship Programme Intake</b>	<b>Existing PhD Candidates' AU Admission Intake</b>	<b>AISG Support</b>
	2018	
<b>August 2021</b>	January 2021	AISG support will commence from their 2 <sup>nd</sup> year studies (January 2022)
	August 2020	AISG support will commence from their 2 <sup>nd</sup> year studies (August 2021)
	January 2020	AISG support will commence from their 3 <sup>rd</sup> year studies (January 2022)
	August 2019	AISG support will commence from their 3 <sup>rd</sup> year studies (August 2021)
	January 2019	Not eligible for transfer



## 4. Eligibility Criteria

4.1 At the point of application, **the interested applicant** must fulfil the following requirements:

- i. Satisfy the criteria and gain admission (January 2021 or August 2021 intake) to a AI-related PhD programme in one of the following Autonomous Universities' (AUs) faculty/school:
  - a. NUS School of Computing; and Faculty of Engineering (Computer Engineering)
  - b. NTU School of Computer Sciences and Engineering;
  - c. SMU School of Information Systems
  - d. SUTD Information Systems Technology and Design Pillar
- ii. Has obtained at least a second Upper Class Honours degree or equivalent in a relevant discipline.

4.2 **An existing PhD candidate** who is currently pursuing in an AI-related PhD programme (four-year programme) is welcomed to apply if he/she:

- iii. Is pursuing a AI-related PhD programme in one of the following Autonomous Universities' (AUs) faculty/school:
  - a. NUS School of Computing; and Faculty of Engineering (Computer Engineering)
  - b. NTU School of Computer Sciences and Engineering;
  - c. SMU School of Information Systems
  - d. SUTD Information Systems Technology and Design Pillar
- iv. Has at least two (2) years remained from his/her four-year PhD programme (based on the intake that he/she was admitted to the AU)
- v. Ensures his/her current scholarship allows a transfer of scholarship support. This should be verified by the host institution's graduate school office before his/her names are submitted to AISG.
- vi. Displays a track record of AI publications in top-tier main track AI conferences and journals will be highly considered. The applicant must be a main contributor (e.g. first author) of the publications.
- vii. Has passed his/her PhD qualifying examinations and a CAP not below 4.0 out of 5.0 system or 3.2 out of 4.0 system (applies to PhD candidates who are at the end of 2<sup>nd</sup> year of studies).

4.3 Other faculty/school proposed beyond the list above is subject to AI Singapore's evaluation and assessment.

4.4 The above eligibility criteria are not exhaustive and AISG may include additional selection criteria based on prevailing fellowship policies. The AISG PhD fellowship terms and conditions may be amended from time to time based on AISG's grantor guidelines.



## 5. Selection Process and Evaluation Criteria

- 5.1 Applicants or candidates are selected based on their strong research interest in AI core technical areas and their motivation to do novel and significant AI research works and publish them in the top-tier AI conference/journals. Hence, a clear articulation of novel and significant proposed research directions in his/her personal statement is important.
- 5.2 Applicants or candidates will also be assessed through their academic excellence and/or awards received (academic and technical) as per the application submission.
- 5.3 Applicants or candidates with **(1) existing publications in top-tier AI conference or journals** and/or **(2) relevant industrial experience and exposure** and/or **(3) recommendations letters from established researchers, faculty members or technical supervisors** will be favourably considered.
- 5.4 All decisions are **final** and no appeals will be entertained.

## 6. PhD Fellowship Programme Timeline

6.1 The schedule for the **PhD Fellowship Programme 2021** is as follows:

Event (PhD Admission January 2021)	Dates
Announcement of Programme	6 August 2020
Opening of Portal for Submission of Applicants / Candidates	13 August 2020
Closing Date for Submission of Applicants / Candidates	18 Sept 2020
Evaluation & Selection of Applicants / Candidates	October 2020
Release of Outcome and Award	Nov 2020
PhD Fellowship Commencement (January 2021)	January 2021





Event (PhD Admission August 2021)	Dates (estimated)
Announcement of Programme and Opening Date for Submission of Applicants / Candidates	19 March 2021
Closing Date for Submission of Applicants / Candidates	30 April 2021
Evaluation & Selection of Applicants / Candidates	May 2021
Release of Outcome and Award	June 2020
PhD Fellowship Commencement (August 2021)	August 2021

## 7. Application / Contact

- 7.1 The AI Singapore Research PhD Fellowship Application Portal is available from **13 August 2020**, on <https://www.aisingapore.org/research/>.
- 7.2 Individual Autonomous Universities (AUs) should submit the AI Singapore PhD Fellowship Programme application form with all the sections duly filled by the stipulated deadline in the following sequence:
- [By AU's officer]** Create an basic account of the applicant / candidate details through the fields available (**Section 1**).
  - [By applicant / candidate]** Upload individual personal statement (Section 2) in a separate PDF.
  - [By applicant / candidate]** Input values through the portal fields (Section 3 and 4).
  - [By applicant / candidate]** Upload individual CV (Annex A) and education certifications (Annex B) in separate PDFs.
  - [By AU's officer]** Verify the details (Section 1 to 4, Annex A and Annex B) and input value through the portal fields (Section 5) for transfer candidates.
  - [By AU's officer]** Endorse and upload Section 6 endorsement page and Annex C in separate PDFs.
- 7.3 Only complete applications with the endorsement of the relevant institutional authority / director of graduate school (or equivalent), will be accepted by AI Singapore.
- 7.4 Each eligible institution<sup>9</sup> **must rank the applicants /candidates in decreasing order of preference** for strong considerations. Applicants / candidates will be reviewed accordingly

<sup>9</sup> Applicable to Autonomous Universities (AUs) offering PhD programme: National University of Singapore (NUS), Nanyang Technological University (NTU), Singapore Management University (SMU), Singapore University of Technology and Design (SUTD)



across all AUs submission ranking **based on merits** of the applicants / candidates.

7.5 New applications and transfer candidates should be ranked separately.

7.6 Additionally, each eligible institution must follow the submission quota (January 2021 intake) below:

i. **For New Applicants,**

- no more than thirty (30) applications each from NUS and NTU;
- no more than fifteen (15) applications each from SMU and SUTD.

ii. **For Transfer Candidates,**

- no more than six (6) applications each from NUS and NTU;
- no more than four (4) applications each from SMU and SUTD.

7.7 Each transfer candidate is a single headcount. There is no partial headcount of transfer candidate in the submission quota.

7.8 Subject to the above criteria, for a combination of new application and transfer cases, each Institution may only submit:

- no more than thirty (30) applications each from NUS and NTU;
- no more than fifteen (15) applications each from SMU and SUTD.

7.9 The table below summarizes the annual submission limit (January 2021 intake):

Submission Quota	No. of applicants/candidates submitted per institution		
	New Applicants	Transfer Candidates	Maximum Submission (Combination)
NUS / NTU	30	6	30
SMU / SUTD	15	4	15

AUs can submit any permutation provided that submission quotas are met. The following list are examples of possible permutation on the submission quota of January 2021:

Submissions quota of **NUS or NTU** in the following permutation examples:

For January 2021		Total Submission Quota
New Applicant	Transfer Candidate	
24	6	30
29	1	30
30	0	30



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Submission quota of **SMU or SUTD** in the following permutation examples:

For January 2021		Total Submission Quota
New Applicant	Transfer Candidate	
11	4	15
14	1	15
15	0	15

7.10 For more information, please contact [research@aisingapore.org](mailto:research@aisingapore.org).



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## 8. Terms & Conditions of Award

- 8.1 The detailed terms and conditions applicable to the fellowship are specified in the letter of offer and will be attached during the award. AISG awarded recipients will have to sign a letter of undertaking if he/she decided to take the award.
- 8.2 AI Singapore will disburse funds on a reimbursement basis. Host institutions shall submit requisitions for claimable expenses permitted and granted under the AI Singapore PhD Fellowship **to AI Singapore on a half-yearly basis** using the forms provided. Requisitions shall include detailed schedules of expenditure incurred for the previous period, as certified by its chief financial officer or an authorised nominee.
- 8.3 No funds shall be disbursed for awarded fellowship holders and his/her relevant expenses unless:
- i. The respective research compliance approvals (where applicable) have been obtained from the appropriate board/office for its research directions.
  - ii. Submission of supervisors/co-supervisors<sup>10</sup> names are provided prior to the second claim or first six-months of the awarded date of fellowship, whichever is the earliest.
  - iii. Satisfactory performance of the awarded PhD fellows by (1) passing the Qualifying Examination and (2) maintain a GPA of 4.0 out of 5.0 system or 3.2 out of 4.0 system.
- 8.4 Awarded PhD fellows are not allowed to engage in any other remunerated employment during AISG's supported period. For pro-bono consulting and other exceptional cases, he or she will require to notify and obtain AI Singapore's approval.

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<sup>10</sup> Supervisor/co-supervisors' name(s) are to be from the following Institution of Higher Learning (IHLs): Agency for Science, Technology and Research (A\*STAR), Singapore Management University (SMU), Singapore University of Technology and Design (SUTD), National University of Singapore (NUS) and Nanyang Technological University (NTU)