CALL-FOR-LETTER OF INTENT (LOI)

SPECIALTY CHEMICALS AME IAF-PP GRANT CALL

February 2017
Background

A*STAR is interested to establish a Specialty Chemicals Programme in the second-half of 2017, funded under the RIE2020 Advanced Manufacturing and Engineering (AME) domain over 3 – 5 years.

The Specialty Chemicals IAF-PP Grant Call takes reference from the Specialty Chemicals Technology Roadmap developed via a consultative process with academic and industry professionals, within the purview of the EDB-A*STAR Joint Industry Sector Planning (JISP) framework.

Objectives of Joint Industry Sector Planning

- To jointly develop the long term technology roadmap for each industry cluster
- Joint execution of R&D plan for each industry cluster

led by EDB Singapore
Background

Defining Specialty Chemicals

Specialty Chemicals:
☑ By performance specifications
☑ Sold in low volumes

Functional specialty chemicals:
• Supplies different markets with functionally similar products

Market-directed specialty chemicals
• Functionally different products for a specific market
Background

Examples of Specialty Chemicals Companies in Singapore

![Company Logos]

Agency for Science, Technology and Research

January 2017
The Grant Call aims to seek proposals in any of the above six (6) Technology Focus Areas (see Annex A for more details) that can support industry development in any of the following Focus End Markets:

<table>
<thead>
<tr>
<th>Market-Directed Specialty Chemicals</th>
<th>Functional Specialty Chemicals</th>
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<tbody>
<tr>
<td>Agriculture Chemicals</td>
<td>Surfactants</td>
</tr>
<tr>
<td>Consumer Care</td>
<td>Functional Polymers</td>
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<tr>
<td>Oilfield &amp; Water</td>
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<tr>
<td>Animal Nutrition and Health</td>
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<tr>
<td>Lubricant Additives</td>
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</table>
Evaluation Criteria

- **Key criteria:**
  - Need for multi-disciplinary approach towards integrated solution
  - Emphasis on economic outcomes for Singapore within 3 – 5 years e.g. establishment of joint labs with industry partners

For more details, please refer to:
https://www.a-star.edu.sg/Research/Funding-Opportunities/Grants-Sponsorship/IAF-PP.aspx
Application Process

- Interested applicants are invited to submit the Letter of Intent (LOI). A copy of the LOI can be found in **Annex B**.

- Submission of LOI is open from **2 - 28 February 2017, 2355 hrs Singapore time (GMT +08:00)**

- Applications must be endorsed by the applying Institution(s) prior to submission.

- Applicants will be invited to submit the full proposals *only if* the LOI has been given in-principle endorsement by the Strategic Oversight Committee (SOC).

- Please direct all enquiries and applications regarding this call to the Secretariat:   
  Ms Rina Soh ([rina_soh@scei.a-star.edu.sg](mailto:rina_soh@scei.a-star.edu.sg))
  Ms Siti Nur Aisyah ([siti_nur_aisyah@scei.a-star.edu.sg](mailto:siti_nur_aisyah@scei.a-star.edu.sg))
Annex A:
Technology Focus Areas

Please note that the industry needs and applications mentioned in this document are non-exhaustive.
Chemical Synthesis of Molecular Switches

Key Industry Needs:
• Molecules that can perform different functions given different environmental stimuli
• Molecular encapsulation

Examples of End-Market Applications:
• Oilfield: Molecule which will demonstrate surfactant functions at high temperatures (in oil wells), but act as a non-surfactant at cool temperatures (when passing through seawater)
• Consumer Care: Molecule which act as a anionic surfactant for cleaning in shampoo, and switches to a cationic surfactant to aid deposition of actives onto hair.
• Animal Nutrition and Health: Molecule that can act as a disinfectant and then as a protection layer against reinfection
• Agrochemicals: Molecule which changes to chemical structure upon exposure to stimuli (e.g. enzymes) to act as anti-fungal agents in crop protection, hence improving specificity of pesticides.
Design & Synthesis of Polymer Structures

**Key Industry Needs:**
- Novel polymers with added-on functionalities
- Areas that complement existing capabilities in companies

**Examples of End-Market Applications:**
- **Animal Nutrition and Health:** Polymer binders for micro-toxins in animal’s GI tract
- **Consumer Care:** Polymers with additional properties e.g. anti-microbial, UV-A/UV-B attenuation, biodegradable
- **Consumer Care / Agrochemicals:** Responsive rheology modifiers
Target Release & Delivery

**Key Industry Needs:**
- Low cost and scalable solutions
- Predictive modelling of target release & delivery solution behaviour
- Encapsulation of multiple actives

**Examples of End-Market Applications:**
- **Consumer Care:** Low cost and steep release of actives in shampoos (e.g. within 2 minutes)
- **Animal Nutrition and Health:** Encapsulation of nutrients to prevent water seepage
- **Animal Nutrition and Health:** Timely release of nutrients throughout an animal’s GI tract (e.g. cows have 4 stomachs)
- **Oilfield Chemicals:** Long term release of scale and corrosion inhibitors for oilfield drilling operations
- **Agrochemicals:** Controlled release (of pesticides, growth regulators, fertilisers etc) to maintain effectiveness to target species, thereby increasing specificity and persistence of biocides and also reduce undesirable side effects of agrochemicals losses by leaching, and degradation.
Intelligent Formulations

**Key Industry Needs:**
- Stable formulations which offer different functionalities at different parts of the lifecycle

**Examples of End-Market Applications:**
- **Consumer Care:** Multiple target releases at different skin layers
- **Oilfield Chemicals:** Biodegradable formulations that can deliver into deeper, hotter wells
- **Agrochemicals:** Pesticide formulations that can penetrate and target the leaves or roots of plants
Performance Modelling (Supporting Capability)

Key Industry Needs:
• Performance modelling to aid scientific explanations and correlations
• High accuracy predictive modelling of formulations and polymer structures
• Increasing innovation speed

Examples of End-Market Applications:
• Consumer Care: In-silico toxicity studies to replace animal testing
• Lubricant Additives: Understanding effects of engine surfaces on formulations
• Agrochemicals: Understanding polymer and microbial membrane interactions to design target delivery of pesticides
• Animal Nutrition and Health: Modelling animal feed intake to optimize feed efficiency
• Oilfield Chemicals: Modelling demulsifier performance
• Oilfield Chemicals: CFD modelling / multiphase flow / fluid structure interaction
Characterization & Analysis (Supporting Capability)

Key Industry Needs:
• Measurement and analytical tools for areas with no recognized measurement standards
• Quantifying product performance, and understanding structure-function relationship

Examples of End-Market Applications:
• **Consumer Care**: Measuring skin elasticity using air pressure
• **Animal Nutrition and Health**: Assessing health of animals through immunology response and/or gene and protein expression
• **Animal Nutrition and Health**: Alternative toxicity measurement methods
• **Lubricant Additives**: In-line lube performance analytics
• **Oilfield Chemicals**: Viscosity testing in harsh conditions
Annex B: 
Letter of Intent (LOI)
## Project Title

<table>
<thead>
<tr>
<th>PI(s) / Host Institution (HI)</th>
<th>Co-I(s) / Collaborator(s)</th>
<th>Duration of Project</th>
<th>Proposed IAF-PP Funding (direct costs only)</th>
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</thead>
<tbody>
<tr>
<td>List the name and institution of the PI(s)</td>
<td>List the name and institution of the Co-PI(s) / Collaborator(s), if any</td>
<td>months</td>
<td>S$</td>
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## Project Objectives and Deliverables

- (maximum 3 bullet points)

## Industry Partners

- List the name of industry partners. Indicate if they are confirmed or potential partners

## Competitive Landscape

- (maximum 3 bullet points)
- 1. Address the global competitive landscape, and explain how the programme will set Singapore apart from competitors.
- 2. Provide an assessment of the local landscape in Singapore.
- 3. Describe how the programme synergizes and brings together similar capabilities and/or develop new capabilities.

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- Please keep to a maximum of two slides for this LOI. Use Arial font size 10.
- Please append email(s) documenting endorsement from Research Office of Lead PI’s institution. (mandatory)
- Supplementary slides and documents (e.g., background on industry and technology, project plans and budgets) can be appended.
### INDUSTRY ALIGNMENT FUND – PRE-POSITIONING PROGRAMME
**LETTER OF INTENT**

<table>
<thead>
<tr>
<th>Relevance to Industry</th>
<th>(maximum 3 bullet points)</th>
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<tbody>
<tr>
<td></td>
<td>Indicate how the proposed programme could:</td>
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<tr>
<td></td>
<td>1. Catalyse development of leading edge technology or a new industry sector(s) in Singapore;</td>
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<td>2. Have the potential to scale up or to cut across different industry clusters; and</td>
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<td>3. Generate economic and health impact in 3-5 years</td>
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<tr>
<th>Potential Value Capture</th>
<th>Indicate how the proposed programme could:</th>
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<tr>
<td></td>
<td>1. Create novel products/services</td>
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<td></td>
<td>2. Help to shape public policies/practices to impact lives</td>
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<td></td>
<td>3. Create new good jobs</td>
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<tr>
<th>Existing Funding Sources (if any) for this proposed programme</th>
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<tr>
<td>1. Name of funding source(s)</td>
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<td>2. Funding quantum</td>
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<td>3. Funding duration</td>
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<tr>
<th>Proposed IAF-PP Funding (S$ mil)</th>
<th>In-kind Contribution by HI, if applicable (S$ mil)</th>
<th>Projected Industry R&amp;D Spending in SG by Industry Partner(s), if applicable (S$ mil)</th>
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<td>Direct Costs</td>
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<tr>
<td>Overheads*</td>
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<tr>
<td>Grand Total</td>
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* 20% of direct research costs