

# Darpa-生物控制-项目

这是此页面已获认可并且最新的版本。

## 目录

- 项目描述
- 项目团队
- 项目动态
- 主题

### 基本信息

外文名称	Biological Control
中文名称	生物控制
管理机构	生物技术办公室

## 项目描述

**(中)** 生物控制计划旨在通过加强与生物网络相互作用，通信和控制相关的基本过程的理解来支持广泛的潜在国防部（DoD）应用。利用该计划下开发的技术，可以建立寻求和减轻化学和生物威胁的系统;导致新型生物材料的开发，增加海军舰船和其他国防部系统对生物污染的恢复能力;通过合成治疗新发疾病的新药来支持军队准备。为实现这些目标，生物控制计划旨在展示合理设计和实施生物系统多尺度闭环控制的工具;测试台评估系统级行为的控制;以及预测和设计有效控制策略的理论和模型。如果成功，该研究将提供由生物部件组成的嵌入式控制器，以实现系统级行为的编程。

**(英)** The Biological Control program seeks to support a wide range of potential Department of Defense (DoD) applications by enhancing understanding of the basic processes associated with biological network interactions, communication, and control. Leveraging technologies developed under this program would enable construction of systems that seek out and mitigate chemical and biological threats; lead to the development of novel biomaterials that increase the resilience of Navy ships and other DoD systems to biofouling; and support military readiness by synthesizing new pharmaceuticals to treat emerging diseases. To accomplish these goals, the Biological Control program aims to demonstrate tools to rationally design and implement multiscale, closed-loop control of biological systems; testbeds to evaluate control of system-level behavior; and theory and models to predict and design effective control strategies. If successful, the research will deliver embedded controllers made of biological parts that enable programming of system-level behavior.

## 项目团队

团队角色	起始年	终止年	机构	团队负责人	团队成员	工作描述	工作描述(中)
管理	2016		生物技术办公室	伊丽莎白.斯特里亚斯基		The objective of the DARPA Biological Control program is to build new capabilities for the control of biological systems across scales “ from nanometers to centimeters, seconds to weeks, and biomolecules to populations of organisms ” using embedded controllers made of biological parts to program system-level behavior. This program will apply and advance existing control theory to design and implement generalizable biological control strategies analogous to conventional control engineering, for example, for mechanical and electrical systems. The resulting advances in fundamental understanding and capabilities will create new opportunities for engineering biology. Specifically, the Biological Control program will demonstrate tools to rationally design and implement multiscale, closed-loop control of biological systems, through the development of biological controllers, testbeds to evaluate control of system-level behavior, and theory and models to predict and design effective control strategies. The resulting capabilities will be inherently generalizable to a variety of biological systems. Successful teams will integrate and apply these capabilities to demonstrate a practical proof-of-principle biological solution to a proposer-defined application relevant to the U.S. Department of Defense (DoD). <a href="https://www.federalgrantswire.com/biological-control-darpa-baa-16-17.html">https://www.federalgrantswire.com/biological-control-darpa-baa-16-17.html</a>	
研发	2016		博思艾伦汉密尔顿控股公司			Contract Number: D11PC20063 Obligated: 20,000(FY 2016)	
研发	2016		博思艾伦汉密尔顿控股公司			Contract Number: D16PC00068 Obligated: 90,000(FY 2016)	
研发	2016		博思艾伦汉密尔顿控股公司			Contract Number: D11PC20063 Obligated: 54,130(FY 2016)	
研发	2016		博思艾伦汉密尔顿控股公司			Contract Number: D11PC20063 Obligated: 40,000(FY 2016)	
研发	2017		加州理工学院			Contract Number: HR00111720008 Obligated: 2,543,822(FY 2017) 1,698,808(FY 2018) 1,590,044(FY 2019)	
研发	2016		杜克大学			Contract Number: HR001116C0138 Obligated: 345,521(FY 2016) 691,042(FY 2017) 684,698(FY 2018) Biological Control Program - Phase I.	
研发	2016		哈佛大学校董委员会			Contract Number: HR00111620049 Obligated: 989,755(FY 2016) 1,975,161(FY 2017) 1,434,379(FY 2018) 1,779,618(FY 2019)	
研发	2016		约翰·霍普金斯大学			Contract Number: HR001116C0139 Obligated: 818,241(FY 2016) 1,636,483(FY 2017) 1,474,225(FY 2018) Biological Control Program - Phase I	
研发	2016		明尼苏达大学			Contract Number: HR001116C0134 Obligated: 1,465,444(FY 2016) 732,721(FY 2017) Biological Control Program; contract award for Study "Achieving closed-loop RNA-based PID Control with a Cell-free Testbed" <a href="https://www.fpd.gov/common/jsp/LaunchWebPage.jsp?command=execute&amp;requestid=99596435&amp;version=1.5">https://www.fpd.gov/common/jsp/LaunchWebPage.jsp?command=execute&amp;requestid=99596435&amp;version=1.5</a> "Achieving Closed-loop RNA-based PID Control with a Cell-free Testbed," funded by the Defense Advanced Research Projects Agency (DARPA). This project develops a new approach to building PID (Proportional, Integral, Derivative) controllers using RNA molecules. This research promises to transform current methods to engineer cellular responses to environmental factors and disease, and could have an impact on biomedicine, healthcare, and the food industry. This \$2.1 million grant is led by a team at the University of Minnesota and also includes researchers at the University of Vermont, North Carolina State University, and Northwestern University. UCR(University of California, Riverside) will receive \$375,000 over 18 months. <a href="https://ucrtoday.ucr.edu/41079">https://ucrtoday.ucr.edu/41079</a> Elisa Franco was awarded a \$371,000 collaborative DARPA grant over 18 months. The project, "Achieving closed-loop RNA-based PID control with a cell-free testbed", is a five-person PI team led by the University of Minnesota that was awarded a total of \$2.1 million. Research aims to develop a new approach to build PID controllers using RNA molecules and promises to transform current methods to engineer cellular responses to environmental factors and disease, and could have an impact on biomedicine, healthcare, and food industry. The RNA PID approach will be tested on a fast, high-throughput testbed in vitro. <a href="https://ucrtoday.ucr.edu/43058">https://ucrtoday.ucr.edu/43058</a>	
研发	2016		舍弗尔公司			Contract Number: D16PC00069 Obligated: 74,073.33(FY 2016)	
研发	2016		西尔维斯技术有限公司			Contract Number: D11PC20063 Obligated: 115,000(FY 2016)	

团队角色	起始年	终止年	机构	团队负责人	团队成员	工作描述	工作描述(中)
研发	2017		哥伦比亚大学	拉斐尔·尤斯特	埃里克·霍尔	Contract Number: HR001117C0026 Obligated: 3,013,454(FY 2017) STUDY ENTITLED"Breaking the Code: Engineering Neural Controllers and Behavior in Hydra" <a href="https://www.fpds.gov/common/jsp/LaunchWebPage.jsp?command=execute &amp;requestid=99596439 &amp;version=1.5">https://www.fpds.gov/common/jsp/LaunchWebPage.jsp?command=execute &amp;requestid=99596439 &amp;version=1.5</a> Positions are available for students to work on a project funded by the Biological Control Program of the Defense Advanced Research Projects Agency (DARPA). The project is entitled "Breaking the code: engineering neural controllers in Hydra" . The project is being carried out by a consortium of seven laboratories at five institutions in the United States. The goal of the project is to build synthetic behavior in the simple animal Hydra by genetically re-engineering its nervous system. <a href="http://apps.bio.uci.edu/bio199/faculty/171/view">http://apps.bio.uci.edu/bio199/faculty/171/view</a> Erik P Hoel, PhD: DARPA – Breaking the Code: engineering neural controllers and behavior in the hydra (~\$7,500,000) <a href="http://www.erikphoel.com/uploads/1/7/8/8/17883727/erik_hoel_cv_website.pdf">http://www.erikphoel.com/uploads/1/7/8/8/17883727/erik_hoel_cv_website.pdf</a>	
研发	2016		普林斯顿大学			Contract Number: HR00111720010 Obligated: 478,499(FY 2017)	
研发	2016		加利福尼亚大学伯克利分校			Contract Number: HR00111620044 Obligated: 529,898(FY 2016) 259,559(FY 2017) 535,872(FY 2018)	
研发	2016		加州大学旧金山分校			Contract Number: HR00111620045 Obligated: 774,219(FY 2016) 1,546,081(FY 2017) 292,559(FY 2018) 873,117(FY 2019)	

项目动态

时间	类型	内容(西)	内容(中)	来源	折叠备注
2016-02-01	进展	<p>Biological Control Proposers Day</p> <p>Solicitation Number: DARPA-SN-16-19</p> <p>The Biological Technologies Office (BTO) of the Defense Advanced Research Projects Agency (DARPA) is hosting a Proposers Day for the potential proposer community in support of a planned Broad Agency Announcement (BAA) for the Biological Control Program. The Proposers Day will be held on Monday, 22 February 2016 from 9:00 AM to 6:00 PM at the Executive Conference Center (4075 Wilson Blvd. Suite 350 Arlington, VA 22203). Advanced registration is required.</p> <p>The goals of the Proposers Day include:</p> <ol style="list-style-type: none"><li>1. Introducing the Biological Control program vision and goals;</li><li>2. Explaining the mechanics of a DARPA program in general and the objectives and milestones of this program in particular; and</li><li>3. Encouraging and promote teaming arrangements among organizations that have the relevant expertise, research facilities, and capabilities for executing research and development responsive to the Biological Control program goals.</li></ol> <p>The Proposers Day will include brief overview presentations by government personnel, an information session to respond to questions from participants, and private sidebar meetings with potential proposer teams that may be scheduled beforehand on the registration website.</p>		<a href="https://www.fbo.gov/index?s=opportunity&amp;mode=form&amp;id=4a74b11b9b511a570471cd0beae5c824&amp;tab=core &amp;_cview=0">https://www.fbo.gov/index?s=opportunity&amp;mode=form&amp;id=4a74b11b9b511a570471cd0beae5c824&amp;tab=core &amp;_cview=0</a>	
2016-02-18	进展	<p>Biological Control</p> <p>Solicitation Number: DARPA-BAA-16-17</p> <p>The objective of the DARPA Biological Control program is to build new capabilities for the control of biological systems across scalesâ from nanometers to centimeters, seconds to weeks, and biomolecules to populations of organismsâ using embedded controllers made of biological parts to program system-level behavior.</p>		<a href="https://www.fbo.gov/index?s=opportunity&amp;mode=form&amp;id=9879ddda5f8cbd30e6e8235c468f66ed&amp;tab=core &amp;_cview=0">https://www.fbo.gov/index?s=opportunity&amp;mode=form&amp;id=9879ddda5f8cbd30e6e8235c468f66ed&amp;tab=core &amp;_cview=0</a>	

主题

生物威胁 ; 生物材料 ; 疾病 ; 药物 ; 治疗

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