

Information for Applicants to the **2016 Research Science Institute (RSI)**

The RSI application is intended to offer each candidate the opportunity to demonstrate depth and strength of background in academics, extracurricular experiences, leadership, and service, as well as to highlight personal motivations, aspirations, and achievements which promise future leadership in science, technology, engineering, or mathematics.

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The Research Science Institute (RSI) is an intensive, six-week summer residential STEM enrichment program co-sponsored by the Center for Excellence in Education (CEE) a 501(c)(3) non-profit and MIT. RSI is intended for students of exceptionally strong academic ability and background, between students' penultimate and ultimate years of secondary school. Typically, this means students apply in the middle of their junior year (third year, or grade 11) in high school. To be considered, younger or older students should seek to obtain an explicit exception granted from CEE.

Each eligible student must apply either as a *Domestic* or *International* candidate:

Domestic RSI Scholars must either be US citizens or legal permanent residents living within the US states or territories, or else US citizens living abroad.

International RSI Scholars must be permanent residents or citizens of one of the participating countries during the 2016 Research Science Institute. Each participating country has its own selection procedure and selection schedule, but successful candidates must in any case complete this online application. Prospective applicants may contact CEE to determine if their country is participating, and if so, they will be put in contact with the appropriate representative at the agency or organization conducting preliminary selection for that country. If an applicant holds dual citizenship with both the US and a participating country of which he or she is a long-term resident, he or she may apply either as a Domestic or International candidate, but not both.

RSI covers room, board, and local transportation for all participating students. Domestic students are expected to cover travel to and from MIT.

Selection of all RSI students is based on evidence of performance in academic and extracurricular settings, passion for science, technology, engineering, and/or mathematics, and promise of future leadership in STEM-related fields. Typically, successful candidates have outstanding academic and extracurricular records and standardized test scores that place them at least in the top 1% of their respective state's or region's secondary school population. Most students chosen for RSI demonstrate additional qualities: they will have already acquired a deep and mature interest in one or more fields of scientific, mathematical, or technological inquiry; they will have displayed outstanding commitment, ability, or potential in one or more of these areas; they will have exhibited exceptional motivation, energy, and dedication in cultivating their skills and pursuing their goals; and they will have sought out and embraced available opportunities to acquire some form of laboratory, field, scholarly, competition, or other enrichment experience beyond the standard classroom exposure.

All interested domestic students are strongly recommended to complete the PSAT before applying to RSI. It is generally expected that PSAT math scores be at least 75, and combined math, critical reading, and writing PSAT scores be at least 220. If taken, SAT scores should generally be comparable (apart from a factor of ten of course), or ACT math and science scores should be at least 33 and verbal scores at least 34. Lower scores will be considered but must be offset by strong indicators of mathematical, scientific, and academic potential exemplified in recommendations, high school grades in challenging coursework, and STEM activities.

We live in an age of unprecedented quantities of data and ubiquitous opportunities for computation. Many RSI research projects will have at least some computational component. While RSI does not require fluency with any particular programming language, it is strongly recommended that all applicants have some experience with a tool, language, system, package, or framework that facilitates the ability to model systems, perform symbolic or numerical mathematics, and/or analyze data. *MATLAB, Mathematica, R, Python, Java, or C/C++* are common choices.

RSI is a very fast-paced program where students are encouraged to learn new things, but also expected to come up to speed quickly. The RSI selection committee looks favorably on applications where the chosen research fields align with the student's academic and extracurricular background. For example, a student who has not completed physics and calculus coursework should think twice before selecting theoretical physics as a proposed research area. A student with little or no biology coursework or training should probably not choose experimental molecular and cell biology.

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The new online RSI application for 2016 is somewhat longer than previous paper versions. It is not intended to discourage any interested applicants, but to better highlight their qualifications, and to allow more efficient review and comparison by members of our selection committee. But please do note:

(a) It is anticipated that several fields may be left blank. No single applicant would be expected to have all of the standardized tests, or coursework, or fluencies with computer languages, or experience with laboratory techniques mentioned, but the application is designed to capture the diversity of skills and backgrounds of a large pool of applicants with varied STEM interests and histories. Information which is relevant to the individual applicant's chosen research fields, or which speaks to general abilities of problem-solving, analytic reasoning, critical thinking, and technical communication, will be of most relevance. For instance, if a student is interested primarily in mathematics and physics, lack of wet-lab biology experience will not put the applicant at a disadvantage.

(b) While all parts of the application will be reviewed with interest and careful consideration, the RSI selection committee will likely spend much time reflecting on the *Personal Statements* (part II.H) and *Letters of Recommendation* (part V.A). Every applicant is encouraged to put careful thought into his or her essays, and the choice of recommenders.

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The RSI electronic application consists of four parts to be completed by the student and/or student's guardian, some with multiple sub-parts. Please ensure that all required responses to

Parts I–IV are completed correctly and submitted online by the relevant deadlines. Please do not attempt to submit or send supplementary materials that are not requested.

The remaining form (part V) is intended to support the candidate's application and is to be completed on behalf of the candidate by nominated individuals. Part V.A. is the form to be used by recommenders to submit confidential recommendations, while part V.B is intended for school officials who will upload copies of transcripts and standardized test scores.

Electronic applications for RSI 2016 are securely hosted and managed by *SlideRoom.com*. To begin the application process, applicants should use **one of the two links below**, depending on how the suggested application fee will be paid.

Before the application itself may be completed, the applicant must first register with SlideRoom, providing some contact information. The applicant must also specify with SlideRoom the two or three individuals who will submit recommendations on behalf of the applicant, as well as the one or two school officials who will be able to post copies of transcripts and score reports for the applicant. **All of these individuals must be listed with *Slideroom.com* as references or recommenders.**

CEE requests, with apology for any redundancy, that some of the information requested by Slideroom be re-entered on the RSI application proper. This provides important validation and cross-referencing.

The different parts within the application may be completed in any order, and applicants may save their work and return later to the online forms, before final submission. **Optional (unasterisked) questions may be left blank**, but all required (asterisked) fields should be completed before submission. Note that certain responses to some questions lead to follow-up questions.

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To be considered, each student's RSI application should include complete, accurate, and up-to-date responses to all required fields (marked with a "*") within the following electronic forms:

I: Personal Data:

A. Applicant Information: basic personal and contact information for the applicant, to be completed by the applicant or the applicant's parent/guardian.

B. Parent/Guardian Information: basic personal and contact information for the applicant's parent or guardian, to be completed by the applicant or the applicant's parent/guardian. Should the applicant be accepted to RSI, this individual may also serve as an emergency contact during the summer.

C. Secondary School Information: data and contact information regarding the applicant's current secondary school and school administration, to be completed by the applicant or the applicant's parent/guardian.

II. Applicant Self-Nomination, to be completed by the applicant:

A. RSI Research Preferences: each applicant must choose a primary research field and sub-field, and a secondary research field and sub-field, of interest to him/her. These must be two distinct areas of interest, and are to be discussed in some depth by the applicant in the subsequent *Personal Statements* section (II.H). The RSI selection committee will tend to look more favorably on applications for which these fields align or overlap with the strengths and background of the applicant. If an applicant is selected, this information will also be of essential use in the placement of the student with a suitable research mentor—although applicants should note that RSI does not promise admitted students specific research topics or placement in particular research groups or labs.

B. Academic Background: surveys the applicant's STEM-related coursework, completed or expected as of June 20, 2016. Do note that not all coursework mentioned would be expected of any one applicant, and coursework relevant to the stated research areas is of greatest interest.

C. Standardized Test Scores: includes self-reported test scores on national standardized tests administered by ETS (PSAT, SAT, SAT subject, AP, or if relevant, TOEFL exams), ACT, Inc., or the MAA (AMC, AIME, USAJMO, USAMO). Copies of scores should also be transmitted to CEE by an official or officials within the applicant's school administration, as nominated in Part III.A by the applicant.

D. Computer Skills and Experience: surveys the applicant's experience and familiarity with various computer operating systems, programming languages, and packages or systems commonly used for simulation, data analysis, modeling, or visualization. Applicants are not expected to have background in all areas or be fluent in multiple programming languages, but some basic computer experience is strongly recommended.

The applicant will first assess overall familiarity within a certain (admittedly sometimes broad or heterogeneous) class of languages, systems, tools, or software. Those rating themselves "slightly familiar" or higher will be asked to specify their level of experience with common examples. Overall familiarity may reflect both depth and breadth of knowledge or experience, but should be more indicative of the applicant's frequency, intensity, or sophistication of the use of one or more tools rather than sheer number of languages or systems of which he or she might have some working knowledge. Applicants may of course look ahead at the list of suggested examples (by choosing anything but "unfamiliar"), then go back and revise their initial rating.

E. Laboratory Skills and Experience: surveys applicant's background in and experience with representative laboratory techniques or instruments common to research in biology, chemistry, physics, or engineering. Extensive prior research skills are not required nor necessarily expected of RSI applicants, but will be of interest to the RSI selection committee (particularly if relevant to the chosen research fields), and, if the applicant is selected, also to prospective research mentors.

The applicant will first assess overall familiarity with methodology in the primary fields of biology, chemistry, physics/material science, and engineering. Those rating themselves "slightly familiar" or higher will be asked to specify level of experience with common examples of instruments or techniques. Overall familiarity might be expected to increase with number of hours devoted as well as the number of different techniques learned or tools applied. Applicants may of course look ahead at the list of suggested examples (by choosing anything but "unfamiliar"), then revise their initial self-assessment.

F. STEM Research Project Experience: offers an applicant an optional opportunity to highlight a significant past research project. Previous research experience can also be listed in the *Awards and Accomplishment* Section (II.G), and discussed in more depth in the *Personal Statements* (II.H). Previous research experience is not expected of every RSI applicant, but certainly may be of interest to the RSI selection committee.

G. Awards and Accomplishments: invites the applicant to list significant achievements, accomplishments, and awards or recognition received in STEM-related areas, including for example: Olympiads, academic bowls, math competitions, science fairs, talent searches, robotics competitions, hackathons, academic or scholarship competitions or prizes, science or math clubs, research internships, scientific publications or conferences, etc.; as well as in non-STEM areas, including for example: performing, visual, or literary arts; athletics; outside hobbies or non-science school clubs; blogging or journalism; student government or leadership; public service, philanthropy, or education; and entrepreneurship. Approximate dates of participation should be included where relevant. Generally, awards and accomplishments should be listed in order of prominence or importance and/or thematically rather than chronologically, so that for instance, national or international prizes are mentioned before local ones.

H. Personal Statements:

Each applicant should carefully prepare reflections on and responses to each of the essay questions, detailing background, achievements, interests, enthusiasm, passions, perspectives, and goals in science, technology, engineering, or mathematics, and beyond. The RSI selection committee will read these responses with great interest and attention.

Some editorial advice is to be expected, but all *Personal Statements* must be written by the applicant.

III. Academic Documentation:

A. Transcript(s) and Score Reports Request:

The applicant is to designate one or two school administrators or other officials who will collect and upload electronic copies of: all secondary-school transcript(s), and any college-level transcripts or online course certifications, for all courses taken by the applicant after primary school and up through the Fall 2015 semester; and also copies of scores or score reports from nationwide standardized tests, particularly the PSAT, SAT, SAT subject, AP, and/or the ACT exams, as well as MAA (Mathematical Association of America) exams if available (e.g., AMC, AIME, USAJMO, USAMO), or comparable exams in other countries. (MAA scores may be requested from the contest manager). Domestic students planning to apply to RSI are strongly encouraged to take the PSAT in the autumn prior to application. Any officials submitting academic records must also be listed with *Slideroom.com* as "references" or "recommenders," so they can be invited to submit supporting documentation on behalf of the applicant. Please warn them that they will receive an invitation from Slideroom to submit a "letter of recommendation," even though they are just expected to upload transcripts or other documents.

B. Sample Publication(s) (optional):

Though most applicants would not be expected to have prior scholarly publications, the RSI selection committee will review pdf copies of one or two articles, papers, or reports if previously accepted to: (i) a peer-reviewed journal, (ii) an officially managed preprint archive such as the *ArXiv* online repository or *Nature Preceedings*, or (iii) an official science competition or talent search. Please do not submit other materials such as newspaper articles or school assignments. Do not submit material if doing so would violate fair-use copyright or intellectual property restrictions.

C. Nomination of Recommenders, to be completed by the applicant:

RSI applicants must arrange for recommendations by at least two and no more than three STEM teachers, instructors, educators, math or science coaches, academic directors, or research supervisors familiar with the applicant and the applicant's scholastic or research record. At least one recommender should be a STEM teacher from the applicant's current secondary school. Applicants who have participated in a substantial research project (several weeks or longer at a university, research center, or corporate or governmental laboratory) are strongly encouraged to request a recommendation from the relevant research supervisor.

These individuals nominated as personal references must also be listed with *Slideroom.com* as recommenders, so they can be invited to submit a recommendation on behalf of the applicant. Recommendations are considered confidential and are not shared with the applicants or administrators at the applicant's school.

IV. Applicant and Guardian Releases and Affirmations:

A. Applicant Releases and Affirmations: consists of affirmations, declarations, and digital signatures required from the applicant. These declarations must be made before the application is submitted.

B. Parent/Guardian Releases and Affirmations: consists of affirmations, declarations, and digital signatures from the applicant's legal guardian (or from the applicant if over 18 years of age at the time of application), as well as information about payment information regarding the suggested application fee (see below for details). These declarations must also be made before the application is submitted.

V. Supporting Documentation to be Submitted on Behalf of the RSI Applicant:

A. Teacher/Supervisor Recommendation Forms for RSI:

Confidential recommendations are to be completed on behalf of the applicant by each of the two or three individuals (nominated by the applicant in in Part IV). Recommenders can either complete the online form or else attach an electronic copy of a letter of recommendation. All recommendations must be received no later than January 26, 2016 to be considered.

Any school officials submitting transcripts or score reports must also be registered as

a "recommender" on Slideroom, and will be invited to submit a "recommendation."

B. Online Submission of Student's Academic Records:

Electronic copies of secondary school transcripts (for courses completed through December 2015), any college-level transcripts, and copies of score reports for standardized tests administered by ETS, ACT, Inc., or the MAA if available should be **collected and collated by the indicated school official(s)** (specified in Part III.A), who should then upload these documents using this online form. The application is not considered complete without these reports. Documents must be received no later than **January 26, 2016** to be considered. The applicant and/or applicant's guardian may have to sign additional waivers or permissions for the school to release copies of these documents.

All individuals submitting recommendations must also be registered as a "recommender" on Slideroom.

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SlideRoom, a subsidiary of Learning Machine, Inc., is a cloud-based application and portfolio management and hosting system. They have a strong reputation for reliability and security. Their online payment system is handled by an industry-leading payment processor, *Authorize.net*, which is fully PCI-DSS compliant. Credit card information is never stored following payment. Slideroom's network security protocols exceed PCI DSS and HIPAA requirements. Data are stored encrypted and hosted securely at a *FireHost.com* data center. All applications are password protected.

Slideroom is fully FERPA compliant and will only release information from RSI applications to authorized CEE employees or to RSI selection committee members. If an applicant is selected to attend RSI, information from the application may also be subsequently shared by CEE with RSI academic staff and with prospective research mentors.

Further information about SlideRoom, including some of their major institutional clients, can be viewed at their website at www.slideroom.com.

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Applicants are asked to pay a (US) \$60.00 application fee. The fee may be waived upon request. Please contact Maite Ballesterro, Executive Vice President, Administration & Programs, CEE @ maite@cee.org.

Only online applications, which are completed and submitted, will be charged.

The preferred method of payment is to CEE through *GiveDirect.org*, because it avoids additional bank and credit card transaction costs. Applicants paying the application fee to CEE (or requesting a waiver of the fee) can start the application process here:

<https://cee.slideroom.com/#/permalink/program/29027>

Then go to www.cee.org/donate for payment details. If using this option, please be sure to indicate in the comments field that the payment is intended as an application fee for the 2016 RSI, and record the transaction ID in Form IV.B.

CEE can also accept personal or corporate checks made payable to "Center for Excellence in Education" and mailed to:

Center for Excellence in Education
8201 Greensboro Drive
Suite 215
McLean, VA 22102
USA

Any applicants choosing to pay the application fee (via a credit or debit card) directly at the *Slideroom* website should instead start the application process at the alternate page:

<https://cee.slideroom.com/#/permalink/program/29174>

Please follow only **one of the two links** above. The applications, and the application process, are otherwise identical except for the chosen method of payment.

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Before final submission, the applicant should endeavor to provide responses which are as accurate, informative, complete, and honest as possible. All asterisked (*) fields must be completed for an application to be submitted, but all other questions are optional, and may be left blank if not applicable. Information is particularly useful which speaks directly to the applicant's curiosity and commitment in STEM, promise of future leadership, development of skills of analytic thinking and effective communication, or to his or her accomplishments and potential in one or both of the chosen areas of research interest as indicated in part II.A.

The online application does **not** need to be completed in one session—prior to the deadline, any applicant can log in as many times as desired, and amend or emend responses, before final submission online. CEE recognizes that the RSI application requires a certain investment of time and thought, but all information requested will help the RSI selection committee make difficult choices regarding very talented, accomplished, and enthusiastic pools of young candidates, and will help the RSI Director place admitted students with suitable research mentors.

Please submit requests to recommenders and to school officials as early as possible, as they tend to get very busy during applications season. **Remember that both the two or three individuals supplying recommendations proper, and the one or two school official(s) supplying transcripts and score reports, are all to be listed under "Recommendors" on the SlideRoom site.** Recommendations and transcripts must be received by the indicated deadline to be considered.

International applicants and those living abroad should note in particular:

- ◆ all **personal names** should be entered in the Roman alphabet and in Western order;
- ◆ all **dates** are to be entered in *mm/dd/yyyy* format;
- ◆ all **telephone numbers** should include any prepended digits needed to call from the

USA;

- ◆ **if a US citizen**, specify this under either primary or secondary citizenship, and be sure to choose either international or domestic candidacy.

SlideRoom.com will send electronic confirmation of successful submission of the RSI application. Generally, applicants will not receive any further confirmation from CEE, unless items are missing from the application. Applicants should not attempt to send any additional information not requested on the online application, unless explicitly contacted by CEE with a specific enquiry or a request for clarification or for supplemental material.

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For the 2016 RSI, the **deadline for domestic applications is January 22, 2016**. The deadline for all transcripts and score reports, and also all recommendations, is January 26, 2016. Deadlines for international scholars will vary—please contact your local representative, or else contact CEE with enquiries.

Incomplete, late, or non-conforming applications may not be considered. Decisions will be announced via email by the end of February 2016.

Questions about the application process may be directed to: Ms. Maite Ballesterro, CEE Executive Vice President, Programs & Administration at (703) 448-9062, or maite@cee.org.

Thank you for your interest in the 2016 Research Science Institute. We look forward to reviewing your application.