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Seminar 33 – How Can I Participate in the ASHRAE Research Program?

A Brief Overview of the ASHRAE Research Program

2013 Annual Conference, Denver, Colorado

Learning Objectives

- 1. Define the purpose of the ASHRAE research program.
- 2. Describe briefly the history, scope, and reach of the ASHRAE research program.
- 3. Explain how students are able to participate in the ASHRAE research program and obtain financial support.
- 4. Provide an overview on the various ways to become an ASHRAE researcher
- 5. Explain the various ways to get a research topic idea considered by ASHRAE
- 6. Describe how project co-funders can help develop, initiate, and monitor an ASHRAE research project.

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Outline/Agenda

- History of ASHRAE Research Program
- Purpose of Program
- Source of Funding
- Areas of Past Research Successes
- Program Facts & Figures
- Research Strategic Plan 2010-2018
- Useful ASHRAE Website Shortcuts

A Brief Overview of the ASHRAE Research Program

History:

- 1912 ASRE commissioned first project to define a “Refrigeration Ton” unit.
- 1919-1961 ASHVE operated independent research lab
- 1959 ASRE and ASHVE merged to form ASHRAE

A Brief Overview of the ASHRAE Research Program

History:

- 1961 ASHRAE research lab closed. Research work contracted to other facilities.
- 1961-Present ASHRAE has completed over 800 projects and spent approximately $70 million on HVAC&R related research projects and student research grants.

A Brief Overview of the ASHRAE Research Program

A Brief Overview of the ASHRAE Research Program

Purpose of Program:

- Conduct and coordinate basic research and technical studies for the Society in the fields of HVAC&R, subject to the proviso that these activities shall be devoted to the public welfare and general benefit, and shall not be designed to promote any individual, private or commercial interests (SBL 7.8).

A Brief Overview of the ASHRAE Research Program

Source of Funding:

- The Society's Research Program is funded completely by donations from individuals, companies, and organizations, and with income generated by the industry exposition held in conjunction with the Society's winter meeting

A Brief Overview of the ASHRAE Research Program

Areas of Past Research Successes:

- Weather Data
- Simplified Energy Analysis Procedures
- Cooling & Heating Applications Using Alternate Energy Sources.
- Fire & Smoke Control Tests & Algorithms

A Brief Overview of the ASHRAE Research Program

Areas of Past Research Successes:

- Thermal Comfort & Indoor Air Quality (IAQ)
- Sound Criteria & Attenuation Methods
- Property Data for Refrigerants, Other Materials & Food
- Heating and Cooling Load Calculation Procedures

A Brief Overview of the ASHRAE Research Program

Program Facts & Figures:

- Largest and longest running program of fundamental and applied research supported by an engineering society in the world
- Current portfolio includes 63 active projects valued at $13.4 million.
- Society's research budget is approx. $2.5 - $3 million per year for projects and grant payments

A Brief Overview of the ASHRAE Research Program

Program Facts & Figures:

- All solicited research projects originate from an ASHRAE Technical Committee
- Majority of projects funded are from solicited research proposals.
- Unsolicited research proposals are possible (Approval Risk- High)
- Support of research projects outside of North America is possible and encouraged

A Brief Overview of the ASHRAE Research Program

Program Facts:

- Approximately 60% of our projects are carried out at a university.
- All other projects are carried out at private research firms, and engineering firms
- Technology transfer achieved through publications in ASHRAE Transactions, ASHRAE Handbooks, Int'l Journal of HVAC&R Research, research bulletins, and ASHRAE special publications

A Brief Overview of the ASHRAE Research Program

- 2010 - 2018 Research Strategic Plan
  - Eleven Goals
  - General Research Themes
    - Energy Efficiency
    - Indoor Environmental Quality
    - Design Tools and Standards
    - Equipment, Components, and Materials
    - Education and Outreach
  - Developed with input from key stakeholders & others
  - Provides outcome-based goals as opposed to specify exact research to be done
  - Plan is updated every 8 years now

Bibliography

- Research Page - Strategic plan, Implementation Plan, RFPs posted for bid, bidders listserv, proposal instructions, projects underway, procedures & forms, completed research, RAC, and research awards & grants

  www.ashrae.org/research

Questions?

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Seminar 33 – How Can I Participate in the ASHRAE Research Program?

Student Involvement in the ASHRAE Research Program

2013 Annual Conference, Denver, Colorado

Learning Objectives

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Outline/Agenda

- About ASHRAE
- ASHRAE Commitment to Students
- Student Member Benefits
- Scholarships, Grants and Awards
- Program Facts
- Web Resources

About ASHRAE

ASHRAE Mission

To advance the arts and sciences of heating, ventilating, air conditioning and refrigerating to serve humanity and promote a sustainable world.

ASHRAE Vision

ASHRAE will be the global leader, the foremost source of technical information, and the primary provider of opportunity for professional sciences of heating, ventilating, air conditioning and refrigerating.

Join ASHRAE if You are Interested in…

- Comfort
- Environment
- Energy conservation
- Heating/cooling/refrigeration
- Standards
- Projects having a direct impact on society
- Design of green/innovative thermal systems
- Building systems

ASHRAE <3 it's Student Members

ASHRAE believes

- **Student members = the future of our Society and our industry**
- **Our future standard of living depends on developing future technicians, engineers and scientists**
- **Recognizes the return value of providing a solid foundation in science, technology, engineering and mathematics**

ASHRAE ♥ ITS STUDENT MEMBERS

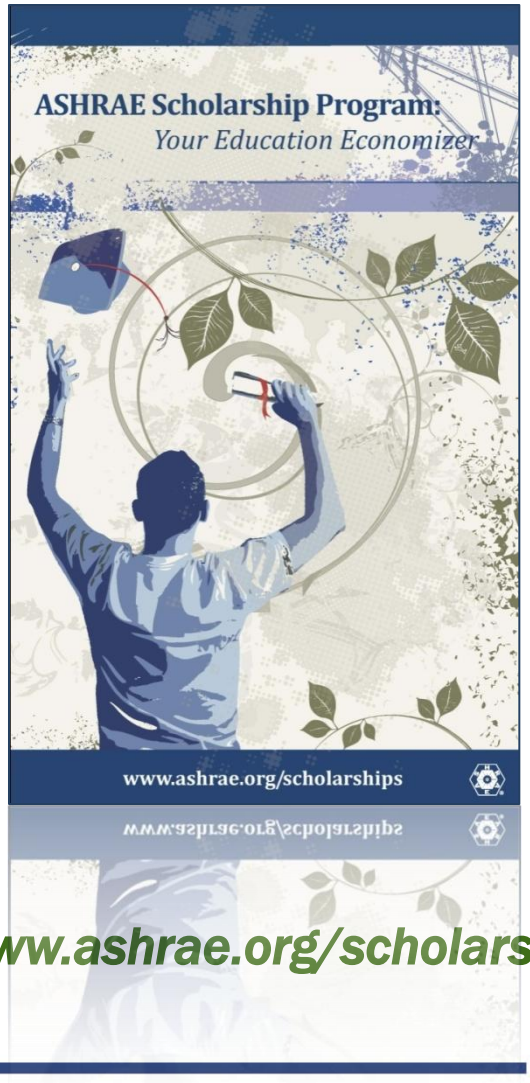
- Networking – meet industry leaders!
- Leadership development – develop leadership potential and enhance your resume!
- Career assistance – find a job or internship at www.ASHRAEJobs.com

- Access to new technology
- Access to Publications – receive the monthly *ASHRAE Journal* and *Insights* newsletter providing the latest cutting edge technology information!
- Discounts on certain ASHRAE Books & Publicatio
- Discounted Annual & Winter Conference Registrat

- Scholarships
- Grants
- Design Competition

Scholarships

- More students and more schools than ever eligible for ASHRAE scholarships
- Two new scholarships available to high school seniors to be applied to their freshman year of college – May 1 application deadline



www.ashrae.org/scholarships

Student Design Competition

ASHRAE sponsors this annual competition to give students practical HVAC experience.

The competition guidelines enable teams to:

- **Design or select the HVAC system for the given building**
- **Or to design a sustainable building implementing an integrated building design process**
  (architectural and building design for sustainability, and its supporting mechanical and electrical systems)
- **Teams may compete in one of the three categories:**
  1. HVAC System Design
  2. HVAC System Selection
  3. Integrated Sustainable Building Design (ISBD)
- **Prizes available: 1st, 2nd, 3rd and Rising Star**

Senior Undergraduate Project Grant

- The *ASHRAE Senior Undergraduate Project Grant Program* provides grants to engineering, technical and architectural schools worldwide with the goal of increasing student knowledge, learning and awareness of the HVAC&R industry through the design and construction of senior projects.

- Professor or Advisor leading the course/project must apply for the grant

- $5000 is the maximum award per team

- Deadline is Dec. 15 annually

For more information and to apply…

ASHRAE Scholarships

- ASHRAE Scholarship Program also serves as an economizer, helping reduce the financial burdens of obtaining your engineering education.
- There are over 20 scholarships available through ASHRAE with even more available through local ASHRAE chapters

ASHRAE Grant-In-Aid Scholarship

- **Scholarships are awarded based on the following and for the academic year following the application deadline beginning with the fall semester:**
  - Full-time enrollment in an accredited undergraduate engineering or engineering technology program
  - A cumulative grade point average (GPA) of at least 3.0 on a scale where 4.0 is the highest
  - Three letters of recommendation
  - Evaluation form
  - Potential service to the HVAC and/or refrigeration profession
  - Financial need
  - Leadership
  - Work ethic

For more information and to apply…

GRANTS-IN-AID
($ 10k each)

- A letter announcing the availability of ASHRAE Grants-In-Aid for Graduate students is sent to over 300 colleges in October of each year.
- **63** candidates applied for a grant and **21** were selected by the RPS (last year we had 65 applicants and selected 23)

Changes to wording and guidelines to be done

HOMER ADAMS AWARD

- Meant for deserving graduate students who participated in an ASHRAE sponsored RP
- Last Year awardee: Ricardo J. Da Silva Lima)-

  Ecole Polytechnique Federale de Lausanne

  Switzerland

  “Heat transfer and two-phase flows (RP-1444)”

Program Facts

- Approximately 60% of our projects are carried out at a university.
- Several of the current senior ASHRAE members were gradate students whose were supported by ASHRAE research
- Several faculty members working in HVAC&R got their tenure thanks in some part to ASHRAE research projects

ASHRAE Student Store

ASHRAE offers students a significant discount of many ASHRAE publications. For a complete list of student discounts visit us on the web.

ASHRAE Publications	Student Price	Full Member Price
ASHRAE Handbooks (IP or SI)	$49	$195
ASHRAE Handbook (CD only)	$39	$155
Air-Conditioning System Design Manual	$45	$76
ASHRAE GreenGuide:	$58	$83
ASHRAE PocketGuide	$20	$39
HVAC Simplified	$29	$67
Load Calculation Applications Manual	$49	$97
Principles of Smoke Management	$38	$99
Principles of Heating, Ventilating and Air-Conditioning	$58	$76
Understanding Psychrometrics	$45	$84

Available Web Resources

- **Student Membership & Meetings**
- **Student Branches**
  Information on maintaining an active branch and establishing a new student branch
- **Career Resources**
  Links to our online virtual career program, career related resources in HVACR. Employers can post student internships for free. www.ashraejobs.com
- **Scholarships, Grants & Design Project**
  Specific information on each of these programs including applications, deadlines and more!
- **K-12 & College Resources**
  Links to our K-12 resources program and handouts. www.ashrae.org/ashraek12.org coming soon!
- **Student Activities News & Awards**

www.ashae.org/students

https://www.ashrae.org/membership--conferences/student-zone/student-branches.

Questions?

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Seminar 33 – How Can I Participate in the ASHRAE Research Program?

How Can I Become an ASHRAE Researcher?

2013 Annual Conference, Denver, Colorado

Learning Objectives

- 1. Define the purpose of the ASHRAE research program.
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Outline/Agenda

- Why Become an ASHRAE Researcher?
- Identify Technical Committee(s) matching your interests
- Technical Committee Organization
- Research Subcommittee Functions
- The Answer is:

How Can I Become an ASHRAE Researcher?

.....WHY?

Unique opportunity

- Networking
- Forum for your ideas
- New idea generation
- Learning from others in your technology
- Benefit your company/organization and career
- Participating with ASHRAE on projects with global impact (sustainability)

How Can I Become an ASHRAE Researcher?

Identify a technical committee matching your technology interests

<u>90 technical committees in 10 sections:</u>

- Fundamentals
- Materials/Processes
- Ventilation/Air Distr.
- Building Performance
- Building Applications
- Environmental quality
- Load Calculations & energy
- Heating/Cooling Systems
- A/C, Refrig. System Comps.
- Refrigeration Systems

How Can I Become an ASHRAE Researcher?

Partial Listing of Technical Committees

Fundamentals: heat transfer/fluid flow, control theory

Environmental Quality: bldg impacts, global climate change

Materials/Processes: refrigerants, lubrication, water treatment

Ventilation/Air: fans, duct design, kitchen ventilation

Bldg Performance: integrated design, commissioning, testing

Bldg Applications: healthcare, educational, residential, commerc.

Refrigeration Systems: piping, foods/beverages, skating rinks

Heating/Cooling Eqpt: hydronic, forced air, solar, geothermal

A/C & Refrig. Components: compressors, heat xchgrs, controls

How Can I Become an ASHRAE Researcher?

Technical Committee Detailed Information

- available on ASHRAE website: https://www.ashrae.org/standards-research--technology/technical-committees/complete-list-of-tcs-with-home-pages
- technical committee scopes, meeting schedules, minutes of meetings, presentations/publications, **research activities**

How Can I Become an ASHRAE Researcher?

Technical Committee Organization

- Full committee
- Subcommittees
  - Program
  - Handbook
  - Standards
  - **Research**

How Can I Become an ASHRAE Researcher?

Technical Committee Research

- Most ASHRAE research projects originate from technical committees
- Current research: 63 projects/$13.4 million
- Research by universities & private research and engineering firms
- Technology transfer by ASHRAE publications: ASHRAE Transactions, ASHRAE Handbooks, …..

How Can I Become an ASHRAE Researcher?

Research Subcommittee Functions

- Identify technology gaps/research needs
- Prepare research proposals for RAC approval and bidding
- Evaluate bid submittals (proposal evaluation subcommittee – PES)
- Monitor research projects (project monitoring subcommittee – PMS)

How Can I Become an ASHRAE Researcher?

The answer is:

Attend meetings of technical committee(s) matching your technology interests

- Full committee and research subcommittee meetings
- Corresponding member listing
- Volunteer for committee activities

New members are wanted/welcomed!

Bibliography

- “Creativity – Flow and the Psychology of Discovery and Invention”, Mihaly Csikszentmihalyi, HarperCollins, New York (1996)
- ASHRAE website sections such as www.ashrae.org/research

Questions?

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Seminar 33 - How Can I Propose An ASHRAE Research Project?

An Overview of the Research Project Submittal Process

2013 Annual Conference, Denver, Colorado

How to Begin

- Start with an idea for research to satisfy a Society need
  - Ideas generally originate in the TCs
    - Idea coming from an ASHRAE Member
    - Idea coming through ASHRAE TC
    - There are exceptions
  - Idea can come from outside of ASHRAE

ASHRAE Research Priorities

- ASHRAE research addresses the following;
  - Standards
  - Handbooks
  - Guidelines
  - Codes
  - Special publications
  - Software,
  - Web-based tools
  - Papers & journal articles that advance HVAC&R science and technology
- Topics that demonstrate clear support of the ASHRAE Research Strategic Plan

ASHRAE Strategic Plan

- **https://www.ashrae.org/standards-research--technology/research**

RTARs should relate to Strategic Plan

ASHRAE Shaping Tomorrow's Built Environment Today

Research

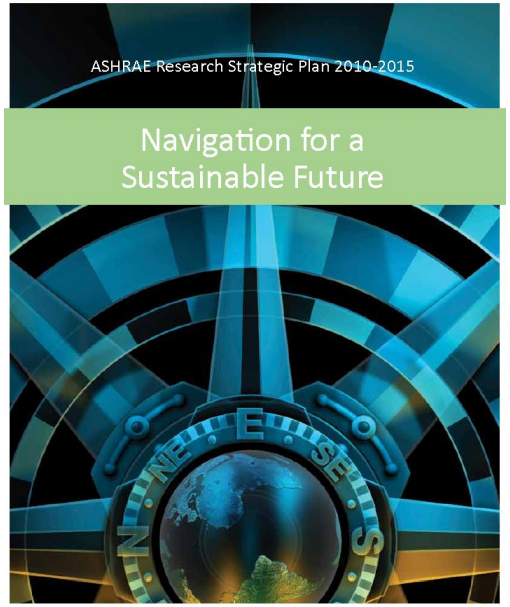
Strategic Plan for Research

ASHRAE 2010-2015 Research Strategic Plan

A new research strategic plan will guide ASHRAE research for the next five years. The plan outlines ASHRAE's research goals for the next five years. It centers on sustainability, which is defined as 'the concept of maximizing the effectiveness of resource use while minimizing the impact of that use on the environment.'

Please review ASHRAE Research Strategic Plan 2010-2015 (PDF)

The 2005-2010 Research Strategic Plan and other background documents that were used to develop the 2010-2015 plan are available immediately below.



Submittal Options

- RTAR
  - Research Topic Appropriation Request
    - Solicited Request
- URP
  - Unsolicited Research Proposal

RTAR’s

Research Topic Acceptance Request

RTAR Submittal Homework

- Review the key literature
- Define the State-of-the-Art and information gaps
- Identify the specific goals served within the ASHRAE Research Strategic Plan
- Define a valuable and feasible objective

RTAR Submittal Homework

- Coordinate with other relevant TCs
- Actively solicit co-funding
- Address negative TC votes
- Provide realistic estimated costs & duration
- Define the justification and value to RAC on the project's behalf

RTAR Homework

- Is the work or the “likely” results going to be free of legal implications
  - Benefit only a single manufacturer?
  - Or single class of manufacture?
  - Single Engineering Firm?
  - Utility?
  - Other entity?

Use the Proper Form

- Use the current RTAR form!!

https://www.ashrae.org/standards-research--technology/research

RTAR Form

https://www.ashrae.org/standards-research--technology/research

RTAR Submittal

- List the project goals
- State the approach that will be taken to accomplish the intended advancement to the state-of-the-art
- List the clear objectives
- Provide a complete description of technical approach and task statement

RTAR Submittal

- Applicability to Strategic Plan
  - Identify by number, profession, or industry the ASHRAE members affected
  - Quantify the anticipated time period over which widespread adoption would take place.
  - Indicate the likelihood of ASHRAE's obtaining any intellectual property rights from this project
  - List Key References

Coordinate with Research Liaison

- Have your RAC Liaison review the RTAR before the TC vote!
  - Make sure your Research Liaison is informed!

Deadlines

- Submit RTARs by May 15, August 15 or December 15 to be considered by RAC.
- There is no limit to the number of RTARs that a TC can submit.
  - 2 Year Limit until WS

RTAR Acceptance Criteria

- Research Project should satisfy the following:
  - Is there a well-established need?
  - Is this appropriate for ASHRAE funding?
  - Is there an adequate description of the approach in order for RAC to be able to evaluate the appropriateness of the budget?
  - Is the budget reasonable for the project scope?
  - Have the proper administrative procedures been followed?

RTAR Acceptance Criteria

- Can the ASHRAE Research Budget afford a project of this stature
  - Should the project be contracted or protracted for budgetary reasons
- Can ASHRAE complete the project sponsorship if co-funding does not materialize?

RTAR Evaluation Form

Project ID	**0007**	
Project Title	Design on A Dime	
Sponsoring TC	TC 12.5	
Cost / Duration	$250,000/24M	
Submission History	1st Submission	
Classifications: Research or Technology Transfer	Basic/Applied Research	
Tech Weekend 2010 Meeting Review	**Reviewer's Name: AB**	
Check List Criteria	**Satisfied?**	**Comments & Suggestions**
Is there a well-established need? The RTAR should include some level of literature review that documents the importance/magnitude of a problem. If not, then the RTAR should be returned for revision.	N	This project would greatly benefit the handbook chapter noted but there is no mention of the related standard XXX in development.
Is this appropriate for ASHRAE funding? If not, then the RTAR should be rejected. Examples of projects that are not appropriate for ASHRAE funding would include: 1) research that is more appropriately performed by industry, 2) topics outside the scope of ASHRAE activities.	Y	
Is there an adequate description of the approach in order for RAC to be able to evaluate the appropriateness of the budget? If not, then the RTAR should be returned for revision.	Y	
Is the budget reasonable for the project scope? If not, then RTAR could be returned for revision or conditionally accepted with a note that the budget should be revised for the WS.	Y	
Have the proper administrative procedures been followed? This includes recording of the TC vote, coordination with other TCs, proper citing of the Research Strategic Plan, etc. If not, then the RTAR could be returned for revision or possibly conditionally accepted based on adequately resolving these issues.	Y	

URP’s

Unsolicited Research Proposals

URP's

- An unsolicited research proposal (URP) is a research proposal initiated by a proposer seeking funding from ASHRAE.

  URPs should fall within the general research goals of the Society

  - Unique and innovative projects that cut across research activities

URP Submittal

- **https://www.ashrae.org/standards-research--technology/research**

URP's

- **URP Submittal Guidelines**
  - **Grant of funds Form**
  - **Contractor Information**

URP Submittal Requirements

- URP's should include the following:
  - Title
  - Executive Summary
  - Applicability to Strategic Plan
  - Application of Results
  - Background (State of the Art)
  - Justification to ASHRAE
  - Objectives
  - Scope/ Technical Approach

URP Submittal Requirements
(Continued)

- Deliverables
  - Progress Reports
  - Final Report
- Schedule
- Costs
- Personnel
- References
- Release of responsibility for proprietary or confidential material

Grant of Funds Form

ASHRAE APPLICATION FOR GRANT OF FUNDS
(to be completed by Applicant)

1.0 Title:

2.0 Principal Investigator (P.I.):

3.0 Name of Contracting Institution:
Mailing Address of P.I.:

E-mail address of P.I.:
Phone No. of P.I.:
Fax No. of P.I.:

Other Key Personnel:

4.0 Any subcontractors:

5.0 Objective & Scope:*

6.0 Project Start Date:_____ Total Project Length:_____

7.0 Total Cost: US$_____ ASHRAE Funding Requested: US$_____

8.0 Details of Financial Support:

a) Professional Salaries	$_____	Person Months_____
b) Research Assistants	_____	
c) Fringe Benefits (%)	_____	
d) Equipment	_____	
e) Supplies & Materials	_____	
f) Computer Costs	_____	
g) Travel & Communications	_____	
h) _____	_____	
i) Total Direct Costs	_____	
j) Indirect Costs (%)	_____	
k) TOTAL	$_____	

9.0 Qualifications of Principal Investigator:*

10.0 Signature of Project Manager or P.I.:_____

URP Submittal

- URP's should be submitted to MORTS
  - MORTS assigns the URP a number
- The MORTS will work to identify an appropriate "liaison" from within RAC
  - The URP liaison in most cases will be the Research Liaison for the section of TCs that best aligns with the focus of the URP.

URP Submittal Process

- The URP liaison will perform an initial evaluation and recommend to RAC that the proposal either be:
  - Rejected and returned to the proposer
  - Accepted and moved forward

URP Submittal Process

- In exceptional cases: work that is a follow-on to a previously sponsored project may also be considered:
  - When it has convincing benefits
  - Where the original sponsoring TC is supportive
  - Where the previous contractor has a competitive advantage with respect to experience and facilities

URP Submittal Process

- If the URP liaison determines that the URP should be considered for funding
  - Identifies an appropriate TC
  - The TC appoints a PES
- If the liaison, in consultation with MORTS, determines that the URP is follow-on:
  - PES & TC need to write a letter of support of URP

URP Submittal Process

- The PES should use the same basic criteria used in evaluating “solicited” work (RTAR’s), but also consider;
  - Whether the unsolicited work is of equal or greater importance of that in the TC’s Plan
  - The TC must also consider the cost and benefit to the TC, the Society and the public

URP Submittal Process

- If the PES recommends the project be funded
  - The approval steps are identical to an RTAR
- If the TC rejects the URP
    - An explanation to the MORTS is required
- If disapproved (at any level):
  - MORTS returns the URP to the proposer with a brief explanation for the reason for the rejection

URP Evaluation Form

ASHRAE UNSOLICITED RESEARCH PROPOSAL EVALUATION FORM

Criteria 1 through 10 should be rated from `0' to `10' with the higher numbers favoring funding
The ratings for individual criteria are to provide guidance for evaluation, they are not meant to be additive. Some criteria may not apply (e.g., student involvement, literature review, performance on previous ASHRAE research projects.)

Project #_____URP Principal Investigator:_____

URP Title: _____

Evaluation criteria
Is this appropriate ASHRAE research? (If not, state reasons. If so, proceed to evaluation criteria.)

1. Applicability to ASHRAE Research Strategic Plan (0-10): _____
   Give names names & numbers of goals: _____
2. Application of Results (0-10) _____

3. State-of-the-Art/Literature Review (0-10) _____

4. Advancement of the State-of-the-Art (0-10) _____

5. Justification and Value to ASHRAE (0-10) _____

6. Objectives/Scope/Technical Approach _____

   a) Theoretical work clearly addressed (0-10) _____
   b) Experimental work clearly addressed (0-10) _____
   c) Technical value of the proposed work (0-10) _____
   d) Detailed and logical work plan with major tasks and key milestones (0-10) _____
   e) Deliverables clearly defined (including intermediate deliverables (0-10) _____
      for project monitoring)

7. Contractor's capability in terms of facilities (0-10) _____

   a) Managerial support
   b) Data collection
   c) Technical expertise

8. Qualifications of personnel for this project (0-10) _____

   a) Project team 'well rounded' in terms of qualifications and experience in related work
   b) Project manager person directly responsible; experience and corporate position
   c) Team members' qualifications and experience
   d) Time commitment of Principal Investigator

9. Student involvement (0-10) _____
   a) Extent of student participation on contractor's team
   b) Likelihood that involvement in project will encourage entry into HVAC&R industry

10. Performance of contractor on prior ASHRAE projects or other research projects (0-10) _____

11. Other considerations: _____

12. Recommendation and Justification: 1) Approve Funding; 2) Return for Revised Submission (PES/TC to provide suggested modification to scope or technical aspects of project.); or 3) Reject. Justifications should be provided. _____

Deadlines

- Submit by May 15, August 15 or December 15 to be considered by RAC.
  - Same as those of an RTAR

Questions?

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