

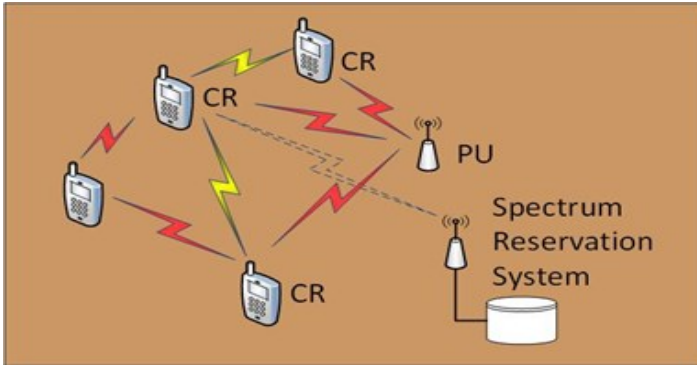
# SPECTRUM – SHARC

An adaptive and cognitive radio design contest for students

**3 Chances to Win Prizes! Win for your school! Win for your team!**

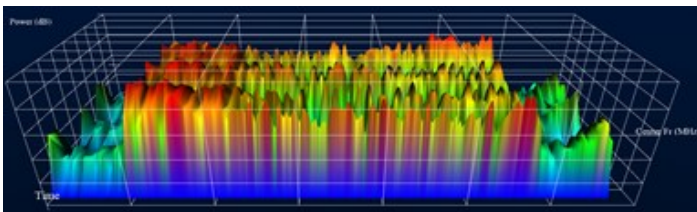
*And have fun learning about an exciting new way to use radio spectrum!*

**1st Place: \$5,000 2nd Place: \$3,000 3rd Place: \$1,500**



*Example Spectrum-ShaRC operational scenario CR = contest participants' cognitive radios PU = Primary (higher-priority) radio spectrum User Contest participants' radios may be required to search for available frequencies autonomously or collaboratively and / or consult a central spectrum reservation database.*

**Spectrum sharing is projected to lead to a trillion dollars in societal benefits (President's Council of Advisors on Science and Technology, , 2012)**



The CORNET 3D spectrum display will allow students to view their radios' spectrum use as well as activity of potentially interfering signals

The **Spectrum-ShaRC** (spectrum sharing radio contest) will take place during the 2015-16 academic year, with a final round in May 2016. Qualifying teams may also have the option to attend a special invitational round at a U.S. government lab.

The contest will use the cognitive radio test system (**CRTS**), a framework developed for cognitive radio experimentation and performance measurement, and Virginia Tech's Internet-accessible **CORNET** cognitive radio testbed to measure performance of student-designed cognitive or adaptive dynamic spectrum access radios in challenging operational environments.

Teams will begin with **ready-to-run** software, provided **at no cost** by the contest organizers. This software will consist of a reference waveform implemented using open-source software-defined radio (SDR) software such as liquid-dsp and / or GNU Radio, and will serve as a starting point for the students' own designs to ensure that the contest provides both a low barrier to entry and potential for extensive innovation.

## 2015-16 Academic Year

**Deadline to enter is Oct. 15. First round of competition Nov. 15**

**Final Competition held during the Wireless @ Virginia Tech Symposium & Summer School, Blacksburg, VA, May 25-27, 2016 (remote or on-site)**

**Travel support available for qualifying students**

**Sponsored by The Bradley Department of Electrical & Computer Engineering, Motorola Solutions and Wireless @ Virginia Tech**

Contact [cdietric@vt.edu](mailto:cdietric@vt.edu) (subject: Spectrum Contest) for more information

**Timeline:**

- October , 2015: Entry forms due\*  
\*later applicants may forfeit points in the PHY competition
- ~November 15, 2015: PHY Layer Adaptation Competition
- ~February 15, 2016: MAC Competition
- ~April 15, 2016: Network Competition
- May 25-27, 2016: Final Competition in Blacksburg, VA

**Support:**

- Written instructions and other documentation will be provided
- Virginia Tech wireless researchers will be able to answer questions by email list or forum
- Each team will be given working code free of charge.
  - The code will be for a pair of basic transceivers that are implemented using open-source software defined radio software and can transmit and receive data over the air using the CORNET testbed or similar hardware.
  - Teams will be given new baseline code for each stage of the competition (PHY, MAC, Network)
- Teams will be given accounts on Virginia Tech's Cognitive Radio Network Testbed (CORNET)
  - Teams will be able to improve and test their radio software using CORNET's servers, USRP software-defined radios, and FCC experimental licenses and the Cognitive Radio Test System (CRTS) software
  - Any software bugs identified in this process can be reported using Github

**How to Enter:** Use the attached entry form to register your team!

**Spectrum-Sharing Radio Contest 2015-16 Entry Form (Due 10/15/2015)**

**Sponsors:** The Bradley Department of Electrical & Computer Engineering, Motorola Solutions, and Wireless @ Virginia Tech

Team Name: \_\_\_\_\_

Institution: \_\_\_\_\_

Advisor's printed name: \_\_\_\_\_

Advisor's email address: \_\_\_\_\_

Phone number: \_\_\_\_\_ Secondary phone number: \_\_\_\_\_

**Conditions of Participation:**

1. Virginia Tech (VT) will have a no-cost, royalty free, nonexclusive license to use the entry (code and documentation) internally for research. Thus, VT keeps the entries.
2. VT will provide space to store files of participating teams and will take reasonable measures to restrict access to each team's files to that team's members and to Virginia Tech personnel. However, VT is not liable for loss or corruption of electronic files or for loss of points or competitive advantage in the contest due to hardware or software failures, human error, or any other causes, or for unauthorized access to files by other parties and any associated detrimental effects to affected team or teams. Participating teams are encouraged to make frequent backups of all of their files in case files stored on VT's CORNET servers are lost or corrupted.
3. The faculty advisor and participants in this contest are responsible for complying with all applicable laws, regulations, and restrictions, including export restrictions and Federal Communications Commission rules, and for protection of any proprietary information or items used in the contest. Each team that is invited to the final competition will give a brief presentation on their work for the contest and provide a report of up to 4,000 words plus figures and tables, to be posted on the Wireless @ Virginia Tech website.
4. Participants who attend the final competition at Virginia Tech will attend all contest-related events, including those hosted by contest sponsors.
5. Any visit to Virginia Tech by a foreign national is subject to an export compliance review. Please refer to <http://www.iss.vt.edu/index.php/vt-department-host/visitor-b-visa-waiver>

My signature below indicates that I understand and will comply with the above conditions:

\_\_\_\_\_  
Faculty Advisor Signature

\_\_\_\_\_  
Date

Names, Status (G=graduate, U=undergraduate), Signatures and dates for team members (1-10)

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**Sponsors: The Bradley Department of Electrical & Computer Engineering, Motorola Solutions, and Wireless @ Virginia Tech**