



# OSFS Statement

Newsletter of the **Ottawa Science Fiction Society, October 2013,**  
**Issue 414, Volume 37, Number 10.** Founded Feb 1977, Incorporated Jan 16, 1979

## THE 2013 AURORA AWARDS WINNERS

The winners of the 2013 Aurora Awards, presented by the Canadian Science Fiction and Fantasy Association, were announced at Ottawa's Can-Con October 6th.



Accepting their Aurora awards: Kari Maaren, Hayden Trenhold, Brett Alexander Savory (for Erik Mohr), Tanya Huff, Robert J. Sawyer lifetime award also accepting for David Clink, Clifford Samuels (for Randy McCharles and Ron Friedman), and Derek Newman-Stille. Photo: Eileen Capes.

## **.Dinner-Gatherings**

6:00 p.m. at the Colonnade Pizza, 280 Metcalfe Street, Ottawa, at the corner of Metcalfe and Gilmour.

Please RSVP to <http://www.meetup.com/ottawasfs-ca/events/94895822/> to give us an estimate of the number to expect. Note that we are now communicating primarily by web site and Meetup.

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OSFS Logo	Bruce Wright
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## Nobel Prize in Literature

**Alice Ann Munro** (*née* Laidlaw; born 10 July 1931) is a Canadian author writing in English. The recipient of the 2013 Nobel Prize in Literature and the 2009 Man Booker International Prize for her lifetime body of work, and a three-time winner of Canada's Governor General's Award for fiction.

The focus of Munro's fiction is her native Huron County in southwestern Ontario.<sup>[4]</sup> Her "accessible, moving stories" explore human complexities in a seemingly effortless style. Munro's writing has established her as "one of our greatest contemporary writers of fiction," or, as Cynthia Ozick put it, "our Chekhov." In 2013, Munro was awarded the Nobel Prize in Literature for her work as "master of the modern short story".

## **CSFFA Award**

For the first time in 30 years — and only the fourth time ever — the Canadian Science Fiction and Fantasy Association (CSFFA) is bestowing a Lifetime Achievement award and the recipient is Ottawa-born

author Robert J. Sawyer. Sawyer is to get his award in Ottawa on Oct. 6. He is one of only eight writers — and the only Canadian — to win all three of the world's top awards for best science-fiction novel of the year:

<http://www.ottawacitizen.com/entertainment/author+Robert+Sawyer+given+lifetime+achievement+award/8938490/story.html>

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## THE 2013 AURORA AWARDS

The winners of the 2013 Aurora Awards, presented by the Canadian Science Fiction and Fantasy Association, were announced at Ottawa's Can-Con October 6th.

\* Special **Lifetime Achievement** award was presented to Robert J. Sawyer, for "his dedication to the promotion of science, science fiction, and mentoring new and aspiring writers." He is the first author to receive the award since 1983, and has been awarded 13 other Auroras in previous years.

\* The Aurora for **Best Novel and the SF Canada** \$1,000 prize went to Tanya Huff for *Silvered* (DAW Books).

\* The inaugural award for **Best YA Novel** was won by Ottawa resident Charles de Lint for *Under My Skin* (Razorbill Canada).

\* **Best Short Fiction** award was won by Douglas Smith for his story "The Walker of the Shifting Borderland."

\* **Best Poem**: David Clink for "A Sea Monster Tells His Story"

\* **Best Related Work**: Hayden Trenholm, editor of *Blood and Water* (Bundoran Press)

\* **Best Artist**: Erik Mohr for cover art, ChiZine Publications

\* **Best Fan Publication**: Derek Newman-Stille for *Speculating Canada*

\* **Best Fan Filk Musician**: Kari Maaren

\* **Best Fan Organizational**: Randy McCharles

\* **Best Fan Related Work**: Ron Friedman

- more -

## SUNBURST AWARD SOCIETY ANNOUNCES WINNERS OF ITS SECOND COPPER CYLINDER AWARDS.

Toronto, Ontario (September 15th, 2013) The Sunburst Award Society is pleased to announce the winners of the second annual Copper Cylinder Awards. The **Copper Cylinder Award** is an annual member's choice award selected by members of the Sunburst Award Society for books published during the previous year.

The **Copper Cylinder Award** derives its name from the first Canadian scientific romance, "*A Strange Manuscript Found in a Copper Cylinder*," by James De Mille (1833-1880). The winners receive a unique, handcrafted, copper cylinder trophy.

The winner of the 2013 **Copper Cylinder Adult Award** is **The Chaos** by Nalo Hopkinson (McElderry Books, ISBN - 9781416954880)

The winner of the 2013 **Copper Cylinder Young Adult Award** is **Starling** by Lesley Livingston (HarperCollins, ISBN - 9781443407656).

**Nalo Hopkinson** lives in Riverside, California. **Lesley Livingston** lives in Toronto.

The **Sunburst Award Society** also confers annually the juried **Sunburst Awards for Excellence in Canadian Literature of the Fantastic**. Both awards celebrate the best in Canadian fantastic literature published during the previous calendar year.

For additional information about the Copper Cylinder Awards, Sunburst Award Society membership and the voting process please visit the website at <http://coppercylinderaward.ca>

**For additional information about the Sunburst Awards, the nominees and jurors, eligibility and the selection process, please visit the website at <http://sunburstaward.org>.**

## MOVIES List submitted by Sandi Marie

### COMING ON DVD SOON

#### OCTOBER

Pacific Rim - Oct 15

Monsters University - Oct 29

#### NOVEMBER

Man of Steel - Nov 12

RED 2 - Nov 26

#### DECEMBER

The Wolverine - Dec 3

### COMING TO YOUR THEATRE

#### OCTOBER

Space Battleship Yamato - TBA

Carrie - Oct 18

#### NOVEMBER

Enders Game - Nov 1

Thor the Dark World - Nov 8

The Hunger Games: Catching Fire - Nov 22

#### DECEMBER

The Last Days on Mars - Dec 6

The Hobbit: The Desolation of Smaug - Dec 13

Walking With Dinosaurs - Dec 20

#### JANUARY 2014

The Amityville Horror: The Lost Tapes - Jan 3

I, Frankenstein - Jan 24

#### FEBRUARY

RoboCop - Feb 7

Vampire Academy - Feb 14

#### APRIL

Captain America: The Winter Soldier - Apr 4

Robocalypse - Apr 25

#### MAY

The Amazing Spider-Man 2 - May 2

#### JUNE

Edge of Tomorrow - Jun 6

How to Train Your Dragon 2 - Jun 13

Transformers: Age of Extinction - Jun 27

#### JULY

Maleficent - Jul 2

X-Men: Days of Future Past - Jul 18

Dawn of the Planet of the Apes - Jul 18

Hercules: The Thracian Wars - Jul 25

## Coming Events

List submitted by Lloyd Penney

- October 18-20 - **CastleCon 2013**, Best Western Plus Durham Hotel & Conference Centre, Oshawa. Gaming convention. - [www.castlecon.net](http://www.castlecon.net).
- October 19-20 - **Geekmarket 2013**, Carleton U, Fieldhouse [www.geekmarket.ca](http://www.geekmarket.ca)
- October 26-27 - **Unplugged Expo 2**, Daniels Spectrum Centre, Toronto. Geek culture convention. Guests: Kurt Lehner, Susan Roman, Stephanie Morgenstern, Mai-Sheri, more. - [www.unpluggedexpo.com](http://www.unpluggedexpo.com).
- October 31 - November 3 - **Youmacon 2013**, Cobo Center, Detroit Marriott at the Renaissance Centre, Detroit, MI. Anime, comics and steampunk convention. Guests: Todd Haberkorn, Kyle Hebert, John Patrick Lowrie, Steam Powered Giraffe. - [www.youmacon.com](http://www.youmacon.com).
- November 1-3 - **Reversed Polarity**, Sheraton Parkway Toronto North, Richmond Hill. Doctor Who 50th Anniversary convention. Guest: Peter Davison. - [www.tcon.ca/reversedpolarity](http://www.tcon.ca/reversedpolarity), Twitter @reversedpolarity, Facebook.
- November 1-3 - **HammerCon V**, Plaza Hotel, Hamilton, ON. Gaming convention. - [www.hammercon.ca](http://www.hammercon.ca).
- November 1-3 - **N2U**, Travelodge Hotel, Ottawa. Anime & gaming convention. - [www.n2u.ca](http://www.n2u.ca).
- November 3 - **Canadian Toycon** Toronto, Sheraton Airport Hotel & Conference Centre, Toronto, ON. - [www.toycon.ca](http://www.toycon.ca).
- November 15-17 - **Astronomicon 12**, Radisson Hotel Rochester Riverside, Rochester, NY. Literary SF convention. Guests: David Gerrold, Liana K, Ed the Sock, Dr. David Stephenson, Tom Rockwell, Peter David, Vincent DiFate, more. - [www.astronomicon.info](http://www.astronomicon.info), page on Facebook.
- November 29 - December 1 - **SFContario 4**, Ramada Plaza Hotel, Toronto. Guests: Seanan McGuire, Dave Kyle, Chandler Davis. - [www.sfcontario.ca](http://www.sfcontario.ca).
- December 6-8 - **Smofcon 31**, Royal York Hotel, Toronto, ON. Convention runners' convention. - [www.smofcon31.org](http://www.smofcon31.org).
- December 14 - **Frostcon 2**, St. Lawrence Centre for the Arts, Toronto. Cosplay/geek convention. Guests: Twinfools, VandorWolf, Faxen Cosplay, Toronto Batman, That Joker Guy, Erin Cossar. - [ontariocosplaycommunity@hotmail.ca](mailto:ontariocosplaycommunity@hotmail.ca), page on Facebook.

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- January 17-19, 2014 - **Legendary ConFusion**, Dearborn DoubleTree Hotel, Dearborn, MI. SF literary convention. Guests: Mike Carey, Rich Morris, Ian Tregillis, Mark Bernstein. - [www.confusion.stilyagi.org](http://www.confusion.stilyagi.org).
- March 7-9, 2014 - **Furnal Equinox 2014**: Circus, Sheraton Toronto Airport Hotel & Conference Centre, Toronto. Furry convention. Guests: Sabretoothed Ermine, Sandy Schreiber. - [www.furnalequinox.com](http://www.furnalequinox.com).
- April 4-6 - **Ad Astra 2014**, Holiday Inn Markham. Guests: David Weber, Anne Groell, Patricia Briggs, Steven Erikson. - [www.ad-astra.org](http://www.ad-astra.org), Twitter @adastrasociety, page on Facebook.
- April 6, 2014 - **GTA Comic-Con**, Oakville Conference Centre, Oakville. - [www.gtacomicon.com](http://www.gtacomicon.com).
- April 25-27, 2014 - **FilKOntario 24**, Delta Airport West, Mississauga. Guests: S. J. Tucker, with the Heather Dale Band; Gary Ehrlich, Piers Cawley. - [www.filkontario.ca](http://www.filkontario.ca).
- April 25-28, 2014 - **Costume Con 32**, Sheraton Airport Hotel, Toronto. - [www.costumecon32.com](http://www.costumecon32.com).
- June 6-8, 2014 - **Bloody Words XIII**, Hotel TBA, Toronto, ON. Mystery convention. Guests: Vicky Delany, more. - [www.bloodywords.com](http://www.bloodywords.com).



## OBITUARIES

**Scott Carpenter**, the second American to orbit the Earth, was guided by two instincts: overcoming fear and quenching his insatiable curiosity. He pioneered his way into the heights of space and the depths of the ocean floor. "Conquering of fear is one of life's greatest pleasures and it can be done a lot of different places," he said. Carpenter followed John Glenn into orbit, and it was Carpenter who gave him the historic sendoff: "Godspeed John Glenn." The two were the last survivors of the famed original Mercury 7 astronauts from the "Right Stuff" days of the early 1960s. Glenn is the only one left alive. In his one flight, Carpenter missed his landing by 288 miles (465 kilometres), leaving a nation on edge as it watched live and putting Carpenter on the outs with his NASA bosses. So Carpenter found a new place to explore: the ocean floor. He was the only person who was both an astronaut and an aquanaut, exploring the old ocean and what President John F. Kennedy called "the new ocean" — space.—

**Kenneth Wallis** 26 April, 1916 - 1 Sept, 2013

By Alasdair Steven

In the post-war years Wing Commander Kenneth Wallis became known for his championing of the autogyro – the one-man mini-helicopter powered by twin propellers, one above and one behind. He was keen to develop it commercially and became well known for his connection with James Bond.

In 1966 designer Ken Adam – Bond film, *You Only Live Twice* – heard a radio interview with Wallis about his autogyros. Wallis was asked if he would like to take on helicopters. His eyes lit up. "You mean the big boys? Give me a chance," he replied with typical enthusiasm. In fact Wallis piloted the autogyro – known as "Little Nellie" – in the movie. "Sean Connery had to sit in the autogyro and put on the helmet, but then he had to get out and it was me who did the first take-off." And he didn't even get a mention in the credits.

Wallis, who was awarded the MBE in 1996 and two months ago his Bomber Command clasp, was a total enthusiast. He had more than ten autogyros and in his Norfolk village he was a much-loved character.

An affable "Biggles" character in a shirt and tie with his white hair rakishly slicked back would hedge-hop over the

fields strapped in with only an elementary safety belt. Until he was 94 Wallis, this magnificent man in his flying machine, would be spotted in the air.

Wallis visited air shows and displays to drum up interest in the autogyro.

He believed the machine could be of value for military reconnaissance and research purposes.

His plans never really materialised, and, apart from the Bond project, Wallis and the autogyro gained a high profile through two other non-military commissions. Wallis provided camera footage in a concerted search for the Loch Ness Monster in 1970. He flew up and down the loch taking photographs of the deepest parts of the loch, hovering over the darkest waters for many minutes.

His films never proved there was any mammal in the waters.

Wallis joined the hunt for Lord Lucan who disappeared after the family nanny was shot in London's Belgravia in 1974. Amidst much talk of a conspiracy Lucan disappeared after the murder. Over three years from 2006, Wallis shot extensive aerial footage of the Sussex Downs, where it has been suggested Lucan may have committed suicide, for a TV documentary (Into the Wind) .

In 1942 he married Peggy Stapley who predeceased him. They had a son and two daughters.

**Philip Lapp**, whose string of contributions to Canada's space program over a half-century included helping to build the first Canadarm, has passed away at the age of 85 after a long illness.

The aeronautical engineer's list of achievements included helping to build Canada's first satellite. Alouette; working on the early NASA capsules; and co-authoring major space policy.

But he didn't brag about it. "We didn't blow that horn loudly," Lapp said in a 2011 interview with The Canadian Press, describing his contribution to the antennae for NASA's Mercury, Gemini and Apollo space capsules. "Probably we should have. But this is the Canadian way, you know. So we didn't make the exaggerated statements that you hear from other parts of the world."

He also helped establish the Canadian Astronautical Society, the predecessor to the Canadian Aeronautics and Space Institute. He volunteered his time as a member of the board of the Canadian Air and Space museum in Toronto until he became ill.

Robert Godwin, who served as the museum's space curator, said Lapp leaves behind a huge legacy.

Lapp got his start doing his thesis in the U.S. at MIT on long-range ballistic missiles in the 1950s. He designed the guidance system for one of the first rockets the Americans developed, under the classified Atlas program, and says he returned to Canada "with a lot of space stuff in my head."

Godwin also said Lapp co-authored the "Chapman report" which launched Canada's space policy in 1967 and which, he added, has influenced Canada's space program ever since.

In the 2011 Canadian Press interview, Lapp discussed the 50th anniversary of the historic first human space flight by Russian cosmonaut Yuri Gagarin.

He admitted that he admired the Russians back then even though he was frustrated because they had more success with their rockets than the Americans.

"When Gagarin was in orbit, it's probably fair enough to say that I was probably frustrated that we, the western world, were beaten by the Russians again with putting a man in space," Lapp said.

"That was quite an achievement. I had to mix my feelings with an admiration that the Russians were able to do it."

Lapp, who was appointed an Officer of the Order of Canada in 1995, leaves behind a wife, stepdaughter, and two sons and a daughter from a previous marriage.

**Tom Clancy** 1947 - 1 Oct 2013

**By Ann Oldenburg** from USA

Tom Clancy, the American writer who started out as a best-selling military thriller author and later created a video game empire, died Tuesday night at a Baltimore hospital. He was 66.

Clancy penned many a best-seller, including "The Hunt for Red October," "Patriot Games," "Clear and Present Danger," and "The Sum of All Fears". The books spawned commercially successful films with actors Alec Baldwin, Harrison Ford, and Ben Affleck as Clancy's famous fictional character Jack Ryan. Clancy's other famous character, John Clark, has been played by actors Willem Dafoe and Liev Schreiber.

"Tom's novels have always been prescient, whether they were about technology or military tactics or geo-political maneuvering," his editor, Tom Colgan, said after the release of *Against All Enemies*

The author is best known for his Jack Ryan series of military and espionage stories, including "The Hunt for Red October," "Patriot Games," and "Clear and Present Danger."

## LOC

Dear OSFen:

Thank you for the latest Statement, this time issue 413.

Awww, summer's done for another year! Never long enough. Time for a few comments.

It's always beautiful to see monarch butterflies, but I did see something on television this morning that their numbers will probably be at an all-time low. I am not sure of the actual reasons, but I can imagine what they are... weather or climate related, plus some of the heavy rains we had in the summer.

The resident Harry Potter fan here (that's Yvonne) is very much looking forward to the new Wizarding World movies proposed by Warner Brothers and J.K. Rowling. I

think most HP fans have the Newt Scamander book. Glad you liked the convention list, and I hope it helped some with planning their fall activities. We will be at SFContario 4 with a dealer's table, but we'll have to miss Smofcon 31. We had plans to go to the Mini Maker Faire, but it was just too expensive to get in.

We lose friends when authors pass away. Ann Crispin was a surprise to me, but we knew Fred Pohl was likely to leave us, seeing he was in his 90s. I agree with Neil Gaiman, Pohl is the last of the SF greats that I remember. Too many familiar names in the obituary file.

I think that's it for now; take care, and now that it's September/October, everyone stay warm. I need an excuse to come up and visit with you all.

Yours, Lloyd Penney.

## **What does the government shutdown mean for NASA?** Posted by Sarah Scoles

NASA is among the organizations that Congress brought to a standstill. Of its 18,000 employees, only 600 will be allowed to work – 3%, vs. 80% figure for federal workers as a whole - and they won't be paid until the impasse ends. The other 17,400 workers must stay home, not touch their federally owned laptops, hide their work-sponsored smartphones in their freezers, ignore their government email accounts, and catch up on Breaking Bad.

NASA is retaining 600 workers to support the International Space Station (ISS), other missions currently in operation off the surface of planet Earth, and critical operations at each site. Work on planned missions will stop, though some provisions of the shutdown plan take into account that super-complicated and semi-integrated systems can't just be abandoned willy-nilly:

“If a satellite mission has not yet been launched, work will generally cease on that project. The extent of support necessary and the time needed to safely cease project activities will depend on whether any of the activities are of a hazardous nature (e.g., parts of the satellite may need to be cooled),” t

But the workers who chill satellites and make sure ISS astronauts are still able to breathe won't be paid until the government begins operating again.

The thousands of NASA workers who are furloughed are getting unpaid “vacation” time, and certain of the agency's associated private contractors have been warned to limit their spending and preserve their resources. Which sounds a little bit apocalyptic

There is a chance that furloughed employees will be paid retroactively (and also a chance that some contractors will be retroactively compensated for unpaid leave or vacation they had to take). But certain contractors are out of luck. One NASA employee, who spoke with us on condition of anonymity, said, “There's a huge construction project going on at our facility. Dozens of local construction workers have no chance of being repaid.”

Our source also described his site's shutdown. “People were wheeling cart after cart of food and office plants out of the building,” he said. “Everybody was eating the ice cream sandwiches out of the freezer.” Some changed their email auto-responders to snarky messages like, “If you need anything, please contact your local Congressman.”

“We had to shut down computational jobs” the source said. “Computations that take four weeks to run, and they were halfway through, and we just had to stop them. When every last computer was shut off, there was a deafening silence.”

And from your own, non-federally owned, laptops you won't be able to access most of NASA's websites. “If the pages were accessible IT security would have to monitor for hacking, etc. To fully comply with the federal government, all non-critical staff has to be gone, and the safest thing for the websites is to shut them down too.”

So don't wait for AsteroidWatch to let you know if you're about to be hit by a space rock, and don't try to email any of your NASA-employed friends. Do, though, ask them to go to lunch with you or something, because they are probably bored.

## Astrophysics

### **Earth Expected to Be Habitable for Another 1.75 Billion Years**

Habitable conditions on Earth will be possible for at least another 1.75 billion years - according to astrobiologists at the University of East Anglia

Findings published today in the journal *Astrobiology* reveal the habitable lifetime of planet Earth - based on our distance from the sun and temperatures at which it is possible for the planet to have liquid water.

The research team looked to the stars for inspiration. Using recently discovered planets outside our solar system (exoplanets) as examples, they investigated the potential for these planets to host life.

The research was led by Andrew Rushby, from UEA's school of Environmental Sciences. He said: "We used the 'habitable zone' concept to make these estimates - this is the distance from a planet's star at which temperatures are conducive to having liquid water on the surface."

"We used stellar evolution models to estimate the end of a planet's habitable lifetime by determining when it will no longer be in the habitable zone. We estimate that Earth will cease to be habitable somewhere between 1.75 and 3.25 billion years from now. After this point, Earth will be

in the 'hot zone' of the sun, with temperatures so high that the seas would evaporate. We would see a catastrophic and terminal extinction event for all life.

"Of course conditions for humans and other complex life will become impossible much sooner - and this is being accelerated by anthropogenic climate change. Humans would be in trouble with even a small increase in temperature, and near the end only microbes in niche environments would be able to endure the heat.

"Looking back a similar amount of time, we know that there was cellular life on earth. We had insects 400 million years ago, dinosaurs 300 million years ago and flowering plants 130 million years ago. Anatomically modern humans have only been around for the last 200,000 years - so you can see it takes a really long time for intelligent life to develop.

"The amount of habitable time on a planet is very important because it tells us about the potential for the evolution of complex life - which is likely to require a longer period of habitable conditions.

"Looking at habitability metrics is useful because it allows us to investigate the potential for other planets to host life, and understand the stage that life may be at elsewhere in the galaxy.

"Of course, much of evolution is down to luck, so this isn't concrete, but we know that complex, intelligent species like humans could not emerge after only a few million years because it took us 75 per cent of the entire habitable lifetime of this planet to evolve. We think it will probably be a similar story elsewhere."

Almost 1,000 planets outside our solar system have been identified by astronomers. The research team looked at some of these as examples, and studied the evolving nature of planetary habitability over astronomical and geological time.

"Interestingly, not many other predictions based on the habitable zone alone were available, which is why we decided to work on a method for this. Other scientists have used complex models to make estimates for the Earth alone, but these are not suitable for applying to other planets.

"We compared Earth to eight planets which are currently in their habitable phase, including Mars. We found that planets orbiting smaller mass stars tend to have longer habitable zone lifetimes.

"One of the planets that we applied our model to is Kepler 22b, which has a habitable lifetime of 4.3 to 6.1 billion years. Even more surprising is Gliese 581d which has a massive habitable lifetime of between 42.4 to 54.7 billion years. This planet may be warm and pleasant for 10 times the entire time that our solar system has existed!

"To date, no true Earth analogue planet has been detected. But it is possible that there will be a habitable, Earth-like planet within 10 light-years, which is very close in astronomical terms. However reaching it would take hundreds of thousands of years with our current technology.

"If we ever needed to move to another planet, Mars is probably our best bet. It's very close and will remain in the habitable zone until the end of the Sun's lifetime -- six billion years from now."



## Astronomy

### Trickle Down Ken Tapping, 1st October, 2013

One of the mandates of our organization, the National Research Council, is the support and implementation of astronomical facilities and instruments for Canadian researchers. This used to be through building and operating facilities in Canada, but increasingly we are into international collaborations to provide instruments beyond the resources of single countries, at the best possible observing sites. Examples of our international projects include the now venerable but continually upgraded Canada France Hawaii Telescope, the James Clerk Maxwell Telescope, the Atacama Large Millimetre Array and the Square Kilometre Array. Then there is the development of the WIDAR number cruncher as our share of the upgrading of the Very Large Array radio telescope. This is all very exciting stuff.

On one hand there is all the science we can do with these instruments; on the other there is the challenge of developing entirely new technologies, many of which will find applications outside astronomical research. This all sounds so far beyond the reach of the backyard astronomer that there is no point in even dreaming about it. However, if we look at how rapidly the exotic technologies associated with front-line astronomical instruments get cheaper, we see amazing possibilities for

the hobby astronomer. These hi-tech astronomical tools “trickle down very quickly these days”. Moreover, the rapid developments in the consumer sphere, for example technologies in software defined radio, trickle upwards into the research community. There are today completely automated amateur observatories that can tell when the night sky is clear, open up and observe many objects of interest, as listed beforehand, record the information digitally and then, when the sun rises, close up again, all while the observer enjoys a good night’s sleep.

Such projects include measuring precisely a number of stars that vary in brightness, seeking planets orbiting other stars, or supernova explosions in distant galaxies. A little while ago I received some observations of cosmic hydrogen clouds in our galaxy obtained using a small dish, a combination of home-made and cable TV amplifiers and a “dongle” intended to make your computer into a radio or TV, costing about \$15. These bits, together with a personal computer, formed a sophisticated radio telescope that would have been way out of reach even a decade ago. Such an instrument cannot compete with professional level instruments, but it certainly opens new areas of exploration for amateurs. This trickle-up of consumer equipment into radio astronomy is what made the new CHIME radio telescope

under development at DRAO possible.

If I had to pick two examples of technological trickle-down, then one would be the digital cameras intended for amateur radio telescopes. These are producing astronomical images of amazing quality. The second would be the increasing ease with which we can record data in digital form. This means that tasks hard to do using hardware can be done easily using software. For years, professional astronomers have been able to just tell the telescope what they wanted to observe, and the telescope would point at that object all by itself. Now you can get backyard telescopes to do that too. This trickle down and trickle up of technology between researchers and the community will continue, maybe even accelerate. Prepare to be further surprised by what our cutting edge facilities are coming up with, and also what is going on out in the backyard on clear, dark nights.

Ken Tapping is an astronomer with the National Research Council's Dominion Radio Astrophysical Observatory.