

Three win Nobel chemistry prize for world's tiniest machines

By MALCOLM RITTER and KARL RITTER
Associated Press

Three scientists won a Nobel Prize in chemistry Wednesday for advances in a field that has big hopes for very tiny machines — the smallest ever built.

Frenchman Jean-Pierre Sauvage, Scottish-born Fraser Stoddart and Dutch scientist Bernard "Ben" Feringa were honored for making devices the size of molecules, so tiny that a lineup of 1,000 would stretch about the width of a human hair.

Someday, experts say, such devices might lead to benefits like better computer chips and batteries, and tiny shuttles that could be injected into patients to deliver drugs directly to infections and tumors. But that's a long ways away.

"There are not big applications looming up tomorrow," Stoddart, 74, a professor at

Northwestern University in Evanston, Illinois, who became a U.S. citizen in 2011, told The Associated Press.

"I applaud the fact that for once in chemistry Stockholm has recognized a piece of chemistry that is extremely fundamental in its making and being," he later told a news conference.

Feringa, 65, is a professor of organic chemistry at the University of Groningen, the Netherlands. Sauvage, 71, is professor emeritus at the University of Strasbourg and director of research emeritus at France's National Center for Scientific Research.

The three men share the 8 million kronor (\$930,000) prize, having "taken chemistry to a new dimension," the Royal Swedish Academy of Sciences said.

Stoddart said when he got the phone call from Stockholm to tell him he had won, he initially suspected a hoax.

When told he was sharing the prize with "two very good friends ... I could relax."

Speaking to the French TV channel itele, Sauvage called the news a memorable moment and a big surprise.

"I have won many prizes, but the Nobel Prize is something very special. It's the most prestigious prize, the one most scientists don't even dare to dream of in their wildest dreams," he said.

Feringa told reporters in Stockholm by phone, "I feel a little bit like the Wright brothers, who were flying 100 years ago for the first time and then people were saying, 'Why do we need a flying machine?' And now we have a Boeing 747 and an Airbus. So that is a bit how I feel."

The academy said Sauvage made the first breakthrough in 1983 when he linked two ring-shaped molecules together in such a way that they could move in relation to each other.

Moving parts are key to a machine, the academy said.

Stoddart took the next step in 1991 by threading a molecular ring onto a molecular axle and showing the ring could move back and forth. By 1994, he could completely control that movement. His group later built a tiny elevator-like machine and an artificial muscle.

Feringa built the first molecular motor in 1999, a molecule that could be made to spin in just one direction. He leads a research group that in 2011 built a "nanocar," a minuscule vehicle with four molecular motors as wheels.

The academy said the laureates' work has inspired other researchers to build increasingly advanced molecular machinery, including a robot that can grasp and connect amino acids, the building blocks of proteins.

Dean Astumian, a physics

professor at U of Maine in Orono, stressed that the field is still very young, rather like when people first had the lever and the wheel.

At first, they combined those tools in simple ways to do simple tasks, but over time they learned to assemble them in ever-more complicated ways to do increasingly dramatic things, he said.

As for molecular machines, "I think we are at the point where people have put together the levers and the wheels in simple ways at present. But partly as a result of the awarding of the prize in this area, he said, it's going to take off," with the creation of more complicated and useful devices.

Donna Nelson, president of the American Chemical Society, agreed that Wednesday's prize will generate attention for the field.

And given the topic, "children are going to love it," she

said. "They're the scientists of tomorrow."

The chemistry prize was the last of this year's science awards. The medicine prize went to a Japanese biologist who discovered the process by which a cell breaks down and recycles content. The physics prize was shared by three British-born scientists for theoretical discoveries that shed light on strange states of matter.

The Nobel Peace Prize will be announced on Friday, and the economics and literature awards will be announced next week.

The Nobel Prizes will be handed out at ceremonies in Stockholm and Oslo on Dec. 10, the anniversary of prize founder Alfred Nobel's death in 1896.

Nobel, the inventor of dynamite, wanted his awards to honor achievements that delivered the "greatest benefit to mankind."

COMING EVENTS



EO file photo

The Pendleton Friends of the Library book sale kicks off Thursday with a members-only preview 7-9 p.m. at the Pendleton Convention Center. The sale is open to the public Friday and Saturday.

THURSDAY, OCT. 6
FRIENDS OF THE UMATILLA LIBRARY BOOK SALE, all day, 700 Sixth St., Umatilla. All you can stuff in a bag for \$1. Runs through Oct. 15. (541-922-5704).

ADULT OPEN GYM, 6-7 a.m., Pendleton Recreation Center, 510 S.W. Dorion Ave. Half-court basketball. (541-276-8100).

WALKING FOR WELLNESS, 8:30-9:30 a.m., Pendleton Recreation Center, 510 S.W. Dorion Ave. (541-276-8100).

PRESCHOOL STORY TIME, 10:15 a.m., Pendleton Public Library, 502 S.W. Dorion Ave. (541-966-0380).

PRESCHOOL STORY AND CRAFT TIME, 10:30 a.m., Milton-Freewater Public Library, 8 S.W. Eighth Ave. (Lili Schmidt 541-938-8247).

BOARDMAN SENIOR MEAL SERVICE, 12 noon, Boardman Senior Center, 100 Tatone St. Costs \$4 for seniors or \$5 for adults. (541-481-3257).

HERMISTON SENIOR MEAL SERVICE, 12 noon, Hermiston Senior Center, 435 W. Orchard Ave. Costs \$4 or free for children under 10. Extra 50 cents for utensils/dishes. Meals on Wheels available. Transportation arranged by donation. (541-567-3582).

PENDLETON SENIOR MEAL SERVICE, 12 noon, Pendleton Senior Center, 510 S.W. 10th St. Costs \$3.50 or \$6 for those under 60. Pool, puzzles, crafts, snacks, Second Time Around thrift store 9 a.m. to 1 p.m. For Meals On Wheels, call 541-276-1926. (541-276-7101).

SENSORY STORY TIME, 12:30 p.m., Boardman Public Library, 200 S. Main St. For birth to age 4. (541-481-2665).

SKILLS FOR LIFE, 3-5 p.m., Pendleton Recreation Center, 510 S.W. Dorion Ave. Includes gym activities and life skills for middle and high school students. Free, but registration requested. (Danny Bane 541-379-4250).

DOMESTIC VIOLENCE VICTIMS REMEMBRANCE EVENT, 5 p.m., Grace Presbyterian Church, 703 S. Main St., Milton-Freewater. A candle-lighting ceremony, followed by refreshments. (541-276-3322).

PICKLEBALL OPEN GYM, 5:15-7 p.m., Pendleton Recreation Center, 510 S.W. Dorion Ave. Combination of tennis, ping pong and badminton. Ages 18 and up only. (541-276-8100).

ARTIST'S RECEPTION, 5:30-7 p.m., Pendleton Center for the Arts, 214 N. Main St., Pendleton. Hermiston artist Arlen Clark will be featured through Oct. 29. Artist talk and refreshments. Free admission. (541-278-9201).

DOMESTIC VIOLENCE VICTIMS REMEMBRANCE EVENT, 6 p.m., Hermiston DVS Advocacy Center, 240 S.E. Second St. A candle-lighting ceremony, followed by refreshments. (541-276-3322).

SUSAN HAWLEY BENEFIT DINNER/AUCTION, 5:30-7 p.m., Stanfield Community Center, 225 W. Roosevelt Ave. Spaghetti dinner, dessert auction and live auction. Donations will be accepted at the door. (cheryltucker@q.com).

COMMUNITY CAMPFIRE AND HAYRIDES, 6-8 p.m. hayrides, 7-9 p.m. campfire, Riverfront Park, Southwest 23rd St., Hermiston. Hayride cost is \$2 per person or \$8 for a family; campfire is free, and marshmallows and hot chocolate will be provided. All ages welcome.

VFW BINGO, doors open at 6 p.m., games start at 7 p.m., Hermiston VFW, 45 W. Cherry St.

FIDDLER'S NIGHT, 6:30-8:30 p.m., Brookdale Assisted Living, 980 W. Highland Ave. Join jam session or just listen. (541-567-3141).

PENDLETON FRIENDS OF THE LIBRARY BOOK SALE MEMBERS-ONLY PREVIEW, 7-9 p.m., Pendleton Convention Center, 1601 Westgate. A wide selection of hardback and paperback books, DVDs, books on tape, magazines and more. Memberships can be purchased at the door. (541-966-0380).

FRIDAY, OCT. 7
FRIENDS OF THE UMATILLA LIBRARY BOOK SALE, all day, 700 Sixth St., Umatilla. All you can stuff in a bag for \$1. Runs through Oct. 15. (541-922-5704).

FREE FIRST FRIDAY, all day, Tamastsiht Cultural Institute,

47106 Wildhorse Blvd. (off Highway 331 near Wildhorse Resort & Casino), Pendleton. (541-966-9748).

ADULT OPEN GYM, 6-7 a.m., Pendleton Recreation Center, 510 S.W. Dorion Ave. Half-court basketball. (541-276-8100).

WALKING FOR WELLNESS, 8:30-9:30 a.m., Pendleton Recreation Center, 510 S.W. Dorion Ave. (541-276-8100).

FALL QUILT SHOW, 10 a.m. to 4 p.m., Boardman Senior Center, 100 Tatone St. Quilt display, fabric and supply vendors, tips and examples from featured quilter Kathy Hyder, hourly door prizes and quilt raffle. Lunch and pie available for purchase. Admission \$3.

PENDLETON FRIENDS OF THE LIBRARY BOOK SALE, 10 a.m. to 8 p.m., Pendleton Convention Center, 1601 Westgate. A wide selection of hardback and paperback books, DVDs, books on tape, magazines and more. Memberships can be purchased at the door. (541-966-0380).

STORY TIME, 10:15-11 a.m., Hermiston Public Library, 235 E. Gladys Ave. (541-567-2882).

TODDLER STORY TIME, 10:15-10:45 a.m., Pendleton Public Library, 502 S.W. Dorion Ave. (541-966-0380).

PENDLETON SENIOR MEAL SERVICE, 12 noon, Pendleton Senior Center, 510 S.W. 10th St. Costs \$3.50 or \$6 for those under 60. Pool, puzzles, crafts, snacks, Second Time Around thrift store 9 a.m. to 1 p.m. For Meals On Wheels, call 541-276-1926. (541-276-7101).

STORY & CRAFT TIME, 2 p.m., Echo Public Library, 20 Bonanza St.

AFTER SCHOOL STORY TIME, 4 p.m., Pendleton Public Library, 502 S.W. Dorion Ave. Older siblings welcome. (541-966-0380).

PENDLETON FARMERS MARKET, 4 p.m. to dusk, 300 block South Main Street, Pendleton. Browse fresh produce, meats, baked goods and plants, locally crafted jewelry and items for the home. EBT, debit and credit cards welcome. (pendletonfarmersmarket.net).

CMEO BLOCK PARTY, 4:30 p.m., 400 block Main Street, Pendleton. Celebrate 20 years of the Children's Museum with family games, food and a beer garden provided by Great Pacific Wine & Coffee Co., live music with Dakota Brown at 5:30 p.m., and a special intermission at 6:15 p.m. to recognize key members instrumental in getting the museum off the ground. Free admission. (541-276-1066).

DOMESTIC VIOLENCE VICTIMS REMEMBRANCE EVENT, 5 p.m., Tienda El Sol II, 203 S.W. Kinkade Ave., Boardman. A candle-lighting ceremony, followed by refreshments. (541-276-3322).

SUSAN HAWLEY BENEFIT DINNER/AUCTION, 5:30-7 p.m., Stanfield Community Center, 225 W. Roosevelt Ave. Spaghetti dinner, dessert auction and live auction. Donations will be accepted at the door. (cheryltucker@q.com).

COMMUNITY CAMPFIRE AND HAYRIDES, 6-8 p.m. hayrides, 7-9 p.m. campfire, Riverfront Park, Southwest 23rd St., Hermiston. Hayride cost is \$2 per person or \$8 for a family; campfire is free, and marshmallows and hot chocolate will be provided. All ages welcome.

VFW BINGO, doors open at 6 p.m., games start at 7 p.m., Hermiston VFW, 45 W. Cherry St.

FIDDLER'S NIGHT, 6:30-8:30 p.m., Brookdale Assisted Living, 980 W. Highland Ave. Join jam session or just listen. (541-567-3141).

PENDLETON FRIENDS OF THE LIBRARY BOOK SALE MEMBERS-ONLY PREVIEW, 7-9 p.m., Pendleton Convention Center, 1601 Westgate. A wide selection of hardback and paperback books, DVDs, books on tape, magazines and more. Memberships can be purchased at the door. (541-966-0380).

FRIDAY, OCT. 7
FRIENDS OF THE UMATILLA LIBRARY BOOK SALE, all day, 700 Sixth St., Umatilla. All you can stuff in a bag for \$1. Runs through Oct. 15. (541-922-5704).

FREE FIRST FRIDAY, all day, Tamastsiht Cultural Institute,

Thursday Morning

STATION	6 AM	6:30	7 AM	7:30	8 AM	8:30	9 AM	9:30	10 AM	10:30	11 AM	11:30	
FOX	11 KFFX	11 AgDay	Hot/ Cleve.	Good Day Spokane			Paid	Ocean M.	Steve Harvey		Law & Order: C.I.		
FOX	3 KPTV	3 Good Day Oregon at 6	Good Day Oregon	Good Day Oregon			Good Day		The 700 Club		Rachael Ray (N)		
CBS	19 KEPR	2 News	News	CBS This Morning (N)			Harry		The Price Is Right		Young & Restless		
CBS	19 KOIN	19 KOIN 6 News at 6 a.m.	CBS This Morning (N)				Let's Make a Deal		The Price Is Right		Young & Restless		
NBC	25 KNDU	6 Wake Up Northwest	Today Judge Judy Sheindlin, Rick Astley (N)				Today Show II (N)		Today Show III (N)		Million? Million?		
NBC	8 KGW	8 KGW News at Sunrise	Today Judge Judy Sheindlin, Rick Astley (N)				Today Show II (N)		Today Show III (N)		Portland Today		
ABC	42 KVEW	4 Northwest	Northwest	Good Morning America (N)			Live! With Kelly (N)		The View		Paid	Middle	
ABC	5 KATU	5 KATU News Morning	Good Morning America (N)				AM Northwest		The View		Live! With Kelly (N)		
PBS	31 KTNW	Stretch	W.L. Yoga	Wild Kratts	Jet Gol	Nature Cat	C. George	D. Tiger	D. Tiger	Sesame St.	Peg + Cat	DinoTrain	Sit and Fit
PBS	59 OPB	13 Sit and Fit	Jet Gol	Nature Cat	C. George	D. Tiger	D. Tiger	Sesame St.	Peg + Cat	DinoTrain	DinoTrain	SuperWI	Thomas

AFTERNOON

STATION	12 PM	12:30	1 PM	1:30	2 PM	2:30	3 PM	3:30	4 PM	4:30	5 PM	5:30
FOX	11 KFFX	11 Paid	Pat. Court	Divorce	Divorce	Judge Mathis	The People's Court		2 1/2 Men	Mike & M.	Last Man	Last Man
FOX	3 KPTV	3 12 O'Clock News	Wendy Williams			The Dr. Oz Show	TMZ Live!		Judge Judy	Judge Judy	5 O'Clock News	
CBS	19 KEPR	2 NameG.	Bold & B.	The Talk (N)		Let's Make a Deal	Dr. Phil		Judge Judy	NFL Kick	NFL Kick	Football
CBS	19 KOIN	2 News	Bold & B.	The Talk (N)		The Doctors	Dr. Phil		News	NFL Kick	NFL Kick	Football
NBC	25 KNDU	6 Wilderness	Paid	Days of Our Lives		Hot Bench	Hot Bench		Wendy Williams		News	NBC News
NBC	8 KGW	8 KGW New	Paid	Days of Our Lives		T.D. Jakes (N)			Ellen DeGeneres (N)		KGW News	KGW News
ABC	42 KVEW	4 The Chew		General Hospital		The Doctors			Rachael Ray (N)		Minute	Minute
ABC	5 KATU	5 The Chew		General Hospital		Harry			Afternoon Live		KATU News @ 4	News
PBS	31 KTNW	Charlie Rose		C. Chiang	Knitting	Stretch	Thomas	Arthur	Nature Cat	Jet Gol	Odd Squad	Wild Kratts
PBS	59 OPB	13 Landscap	Hubert	Charlie Rose		Nature Cat	Bob Build	Cat/ Hat	Jet Gol	Speaks	WordGirl	Odd Squad

EVENING

STATION	6 PM	6:30	7 PM	7:30	8 PM	8:30	9 PM	9:30	10 PM	10:30	11 PM	11:30
FOX	11 KFFX	11 Modern Family	Modern Family	2 Broke G. "And the Upstairs Neighbor"	2 Broke G. "And the First Day of School"	Rosewood	Rosewood	Pitch The Padres take on the Cardinals, whose pitcher broke Tommy's finger in an altercation.	FOX News First at Ten		:35 Law:CI	:35 Anger Management
FOX	3 KPTV	3 6 O'Clock News	Family Feud	Family Feud	Rosewood (N)		Pitch "Beanball" (N)		10 O'Clock News		11 O'Clock News	2 Broke Girls
CBS	19 KEPR	2 NFL Football	Arizona Cardinals at San Francisco 49ers Site: Levi's Stadium -- Santa Clara, Calif. (L)			:15 Action News Special		The Big Bang Theory	Inside Edition	The Simpsons "Coming to Homerica"	Judge Judy	Action News at 11:00 p.m.
CBS	19 KOIN	2 NFL Football	Arizona Cardinals at San Francisco 49ers Site: Levi's Stadium -- Santa Clara, Calif. (L)			:15 Game On! With Stan Brock (L)		Extra	Ent. Tonight	KOIN 6 News	KOIN 6 News/ 11	:35 S. Colbert
NBC	25 KNDU	6 Local News	Family Feud	Wheel of Fortune	Jeopardy!	Superstore "Guns, Pills and Birds" (N)	The Good Place (N)	ChicMed Dr. Manning is forced to figure out a mystery illness; Maggie goes to a family reunion.		Blacklist Red and the Task Force take extreme measures to hunt down one of Kirk's allies. (N)	Local News	:35 The Tonight Show
NBC	8 KGW	8 KGW News at 6:00 p.m.	Live at Seven	Inside Edition	Superstore (N)	The Good Place (N)	Chicago Med "Natural History" (N)	Notorious Julia puts her job on the line to show a tape of a rock star taking advantage of a woman.	The Blacklist "Miles McGrath" (N)	Annalise presents her case that pushes even the Keating 5's morals.	KGW News at 11	:35 Tonight at 11
ABC	42 KVEW	4 Extra	Local News at 6:30	Entertainment Tonight	The Insider	Grey's Anatomy A car crash at a funeral brings a bickering family into the hospital. (N)	Notorious Julia puts her job on the line to show a tape of a rock star taking advantage of a woman.	Notorious "Friends and Other Strangers" (N)	Away With Murder "Always Bet Black" (N)	Murder Annalise presents her case that pushes even the Keating 5's morals.	Local News at 11	:35 Jimmy Kimmel
ABC	5 KATU	5 KATU News at 6	Jeopardy!	Wheel of Fortune	Grey's A. "I Ain't No Miracle Worker" (N)	Notorious "Friends and Other Strangers" (N)	Doc Martin "45 Doc Martin So Queer"	Doc Martin "45 Doc Martin So Queer"	Doc Martin "45 Doc Martin So Queer"	Doc Martin "45 Doc Martin So Queer"	Doctor Blake "Smoke and Mirrors"	:35 Jimmy Kimmel
PBS	31 KTNW	13 In the Americas	Business (N)	PBS NewsHour	Oregon Art Beat	Oregon Guide	Shetland	Scott & Bailey "Professional Divide"			Secrets of Underground London	
PBS	59 OPB	13 In the Americas	Business (N)	PBS NewsHour	Oregon Art Beat	Oregon Guide	Shetland	Scott & Bailey "Professional Divide"			Secrets of Underground London	

STATION	6 PM	6:30	7 PM	7:30	8 PM	8:30	9 PM	9:30	10 PM	10:30	11 PM	11:30
A&E	52	The First 48 "The Good Son/ Jacked Up"	The First 48 "Heartless"		60 Days In	:45 Days In	60 Days "Institutional Knowledge" (N)	Behind Bars "No Room for Error" (N)	:05 The Italian Job	Thieves plan the heist of their lives by creating the largest traffic jam in L.A. history.	:05 The First 48 "Dark Waters"	
AMC	60	The Shawshank Redemption A banker is wrongly convicted of a double murder & is sent to prison for life.	Men in Black A cop is recruited by a secret organization to help control Earth's alien population.									
ANPL	24	I Shouldn't Be Alive	I Shouldn't Be Alive	Alive "Dive of Terror"	Alive "Perfect Storm"							
CMT	43	Cowboys Cheerleaders	K. Pickler	Cowboys Cheerleaders	K. Pickler	Cowboys Cheerleaders	Cowboys Cheerleaders	Cowboys Cheerleaders	Cowboys Cheerleaders	Roseanne	Roseanne	
CNBC	62	Shark Tank	Millionaire (N)	Shark Tank	Shark Tank	Inventor "Life Savers"	Anderson Cooper 360	CNN Tonight	CNN Tonight	CNN Tonight	CNN Tonight	
CNN	68	Anderson Cooper 360	CNN Tonight	CNN Tonight	CNN Tonight	Anderson Cooper 360	Anderson Cooper 360	Anderson Cooper 360	Anderson Cooper 360	CNN Tonight	CNN Tonight	
DISC	51	Fast N' Loud	Fast N' Loud	Fast N' Loud	Fast N' Loud (N)	Fast n' Loud "Episode 4"	The Pickup Artist" (N)	Fast N' Loud	Fast N' Loud	Fast N' Loud	Fast N' Loud	
DISN	26	:10 Underc.	:35 Underc.	:05 Liv/Mad	StuckMid	Underc.	Friends	Friends (N)	Bizaard.	Liv Maddie	Bunk'd	Friends
ESPN	33	NCAA Football Temple at Memphis Site: Liberty Bowl Memorial Stadium -- Memphis, Tenn. (L)				SportsCenter	SportsCenter	SportsCenter	SportsCenter	SportsCenter	SportsCenter	
ESPN2	34	WNBA Basketball. Playoffs	WNBA Basketball Playoffs Chi./L.A. (L)		</							