DISCOVERY
Newsletter of Research and Scholarship

MSU scientists predict big changes after cosmos discoveries

by Evelyn Boswell

Recent findings have put an end to the days of wild speculation about the origin of the universe, says Montana State University-Bozeman researcher Neil Cornish.

A satellite that has been orbiting the sun for the past 1 1/2 years came back with such precise numbers that physicists no longer have to rely on vague notions, Cornish said after the National Aeronautics and Space Administration (NASA) announced results from the Wilkinson Microwave Anisotropy Probe (WMAP).

MSU cosmos explorer Neil Cornish. (MSU photo/Linda Best)

"It's going to really change the field in quite a major way," Cornish said. "It's going to take a while for people to digest it."

Cornish, an assistant professor of physics, is a collaborator of David Spergel of Princeton University, one of the principal researchers in the WMAP mission. The day after NASA reported its findings, Cornish headed for Princeton University to spend a few days brainstorming about the best way to use the new information.

William Hiscock, physics professor at MSU and director of the Montana Space Grant Consortium, said, "What I find most remarkable about the WMAP results is that they have changed what questions we will focus on in cosmology in the future. For my entire career in this field (30 years), we have not known basic numbers such as the age of the universe to within a factor of two (10 to 20 billion years); now we know the value to a 1 percent accuracy: 13.7 billion years.

"The questions cosmologists seek to answer now change from basics such as the age of the universe to understanding the mysteries exposed by accurate knowledge of these basics," Hiscock said.

WMAP found with a high degree of certainty that the universe is 13.7 billion years old and the first star formed "in an awful hurry" – about 200 million years later, Cornish said. It also showed that the universe, unlike the Earth, is flat.

WMAP found that approximately four percent of the universe is made up of familiar material found on the Periodic Table of Elements. The other 96 percent consists of "some kind of material we have absolutely no knowledge of." Of all the material in the universe, 23 percent is dark matter and 73 percent is dark energy. The difference between the two is how they act in gravity, Cornish said. Dark matter acts like ordinary matter when it comes to gravity.

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Research Roundup

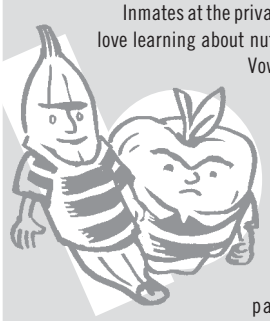
Sonic toothbrushing

Users of the Sonicare toothbrush might be interested in knowing that research done at the MSU Center for Biofilm Engineering stands behind industry claims of a superior toothbrush. Specifically, biofilm scientists developed a lab model for assessing how well powered toothbrushing removes plaque. Dental plaque is a biofilm or a sticky cluster of bacteria that grow on surfaces. Joel Berg, vice president of clinical affairs at Philips Oral Healthcare, the maker of the Sonicare toothbrush, was on campus earlier this month to talk about the research. Philips is one of more than 24 companies that work with the MSU center on biofilm problems. Others include Dow Chemical Co. and five companies in Montana.

Age of whirling

Scientists noticed some time ago that older rainbow trout are less likely to get whirling disease than younger ones. The disease causes deformities in fish that make them more vulnerable to predators. So is it the age of the fish or the size that matters? Eileen Ryce studied about 20,000 fish over five years for her recently awarded doctoral degree at MSU. She found that rainbows 9 weeks or older and at least 2 inches long didn't develop the disease. Ryce said it could be that older fish have better-developed immune and nervous systems or that their greater amount of bone over cartilage, which the disease targets, is protective. The work was funded through the Water Center at MSU.

Captive audience



Inmates at the private prison in Shelby love learning about nutrition, says Jamie Vowell, MSU Extension Agent for Toole County. Vowell brings in rubber food, and they learn about portion sizes. They also enjoy learning about parenting, health and how to find research-based information for themselves. Vowell started helping at the Crossroads Correctional Center when female prisoners were housed there during the expansion of the Montana Women's Prison. The women are gone now, but Vowell continues to work with the men. "I absolutely love it," she said. Vowell said her main reason for going is because most of the prisoners have children. If she can help the prisoners become better parents, it may keep their children from following in their footsteps.

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Dark energy is almost like a repulsive force.

Overall, the mission strongly supported the Big Bang Theory and a portion of that theory known as the Inflation Theory, Cornish continued. Inflation says the universe expanded remarkably fast after its formation.

The satellite confirmed that the universe is expanding, but found it's expanding at an increasing rate, Cornish said. He added that the WMAP findings agreed surprisingly well with measurements taken by other means, like the Keck Observatory in Hawaii and the Hubble Space Telescope.

"These are very exciting results," Hiscock said.

The WMAP resolved some important questions, but it also gave shadowy hints of new mysteries, said Cornish who attended the June 30, 2001 launch of the WMAP. One thing he is studying, for example, is the shape of the universe. Hiscock said scientists will now want to investigate dark matter and dark energy to see what their natures tell us about the future of the universe.

Evelyn Boswell is the technical writer for the Office of Research, Creativity and Technology Transfer.

Euphoria turned to shock as MSU team waited for shuttle

by Evelyn Boswell

MSU students (from left) Stephanie Barton, Ailyn Perez-Osorio, Laura Eaton and Kristine Hale waited for the Columbia to land. (MSU photo/Jeanine Lintner)

Spectators were euphoric as they waited for the Columbia to return from space, according to Montana State University-Bozeman students and faculty who were in Florida among them.

High spirits turned into confusion, though, when the countdown clock reached zero and started climbing again and no one explained why they hadn't heard a sonic boom or seen the spacecraft. And no one told them why the dignitaries and astronaut's families were escorted away from the landing site or why the MSU team had to board their buses without seeing a landing.

Confusion finally turned into horror as people called friends and family on their cell phones and later tuned into CNN only to see the Columbia disintegrating in the blue skies over Texas, Stephanie Barton said after returning to Bozeman.

"People were shocked. We could see people just gasping and looking on in horror at the video of what had just happened," said Barton, a senior from Whitefish.

"I didn't believe anything was wrong," said Kristina Hale, a junior from the East Coast. When she turned on the television in her Florida room and didn't see a landing, "I honestly thought it was because of security measures; maybe they were going to land in California."

Hale finally heard a maid yelling that the Columbia was falling apart, but wanted to believe it was just a satellite.

"It was just unbelievable," Hale said. "... I don't think I will ever forget it. It was terrible."

Kelli Buckingham-Meyer was alone in her room, watching NASA television, when the Columbia was supposed to land. NASA kept saying the same thing over and over – that it had lost contact with the shuttle and had no further information. It wasn't until the other MSU researchers returned that she switched stations and learned about the tragedy.

"I was shocked," said the research specialist with MSU's Center for Biofilm Engineering. "I didn't want to believe that. I think that's part of the reason I hadn't changed the station. I didn't want to think anything bad had happened."

Barton and Hale were two out of four MSU undergraduate students who were in Florida for the Feb. 1 landing. Others were Ailyn Perez-Osorio from Billings and Laura Eaton of Sheridan, Wyo. Besides Buckingham-Meyer, MSU microbiologists there were Barry Pyle, Elinor Pulcini and Susan Broadaway.

The researchers were in Florida because they had designed an experiment that was flying on the shuttle and needed to retrieve their equipment and results. Since the tragedy, the scientists have done limited analysis of their ground samples, but all the results that would have come from the onboard samples were lost.

It was a minor setback compared to the death of seven astronauts, the students and faculty agreed.

"It's hard to be sad about what we were doing, even though it's very important to us," said Perez-Osorio. "When there are major losses like that, you put it in perspective."

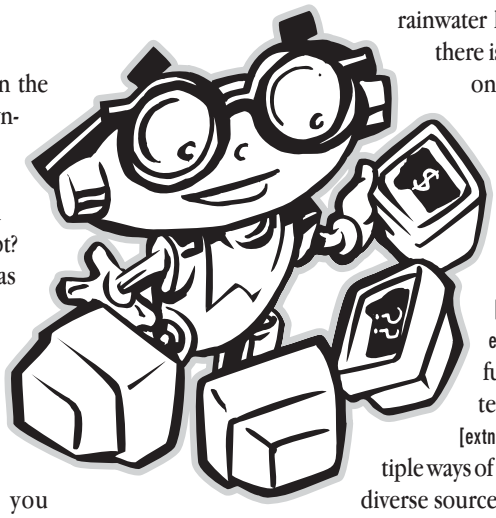
Pyle had seen all seven astronauts at a 2001 crew training session in Holland and probably knew William McCool best of all. Pyle and McCool had talked together, and McCool ran MSU's experiments during the shuttle.

"That's why my focus has been on thinking of the crew and their families and their friends rather than our experiment," Pyle commented.

ON THE WEB

Extend your knowledge with Extension Publications

by Jan Zauha



Are you caught in the grip of new home ownership? Are you embroiled in estate planning or trying to crawl out of a swamp of debt? Doubtless the Web has myriad sites designed to solve your most challenging life problems. The list of 850,000+ hits you'll get on "estate planning" when you search Google [www.google.com], speaking of swamps, is a bit daunting, though. A broad Web search for a topic like "debt relief" is likely to result either in prolonged procrastination or connections you never wanted to make.

So where can you go for quick, reliable, Montana-specific information on basic life issues? The Montana State University Extension Service [extn.msu.montana.edu] offers more information than you realize right on the Web for free.

Those of us who wouldn't recognize yellow toadflax if it jumped up and bit us (can it do that?) may think that Extension publications are only helpful for those with agricultural information needs. This is definitely not the case. Even a quick browse of the MSU Extension Publications Catalog [www.montana.edu/publications] reveals the breadth of topics covered in the MontGuide publications, the 2 to 4+ page fact sheets written by Extension experts for public use.

How do you find specific MontGuides on your topic? You can either search the publications catalog by keyword such as "debt" or browse broad topic areas like Home, Health, & Family. You'll find information there on everything from family financial management to business and community development, gardening, and, of course, agriculture. More than 200 of the MontGuides are available as full-text PDF files or Web pages, free for the clicking. Those publications not available in electronic full-text can easily be ordered, usually for free. What MontGuide topics draw the most interest? Septic tanks, spider identification, lilacs, IRAs, and rainwater harvesting top the list, but there is truly something for everyone in this rich catalog.

The online information offered by MSU Extension Service is not limited to the MontGuides. Their twice-yearly newsletter, Extension Today [www.montana.edu/wwwpb/extoday], is also available in full-text online. The main Extension Service Web page [extn.msu.montana.edu] offers multiple ways of accessing information from diverse sources such as the MontGuides, the newsletter, topical columns written by extension experts, and other resources. For instance, the Google search box on the Extension home page powers a search of the montana.edu domain and can be used to draw together information on your topic from various MSU Extension publications and other University sources. It does not drop you into the big sea of broad Web searching.

The MSU Extension Service is part of a nationwide network of like offices at state land grant institutions. MSU's Extension publications contain information pertinent to Montana climate, environment, laws, and other local details. If you want to search for your topic outside the MSU Extension domain, explore the link to E-Answers [www.e-answersonline.org], a service that extends your topic search to the publications of other states' extension offices. Be aware, however, that they are all written for specific locales. To understand the extension link to Federal government, see the USDA's Cooperative State Research, Education, and Extension Service (CSREES) site [www.reeusda.gov]. Their "State Partners" link can connect you with other state extension offices and cooperative entities across the US.

For help exploring information-rich sites on the Web, or for assistance finding other information, call 994-3171 or stop in at the beautiful new Renne Library reference desk. If you find Web sites or topics that you think might be of interest to the MSU community, please send me an e-mail message at jzauha@montana.edu.

Jan Zauha is the reference team leader for the MSU Libraries.

Student finds research intriguing after all

by Evelyn Boswell

Jeremy Mitchell used to think of research the way some people think of watching sewing tips on TV.

Bor...i...ng.

But his opinion began to change after he volunteered at the Gallatin Community Clinic in Bozeman. There he met Jeff Leid, another volunteer, and Leid told him about the research he was doing at the Center for Biofilm Engineering (CBE) at Montana State University-Bozeman. He suggested Mitchell give it a try.

Jeremy Mitchell
(MSU photo/Niki Nason)

"It sounded like it would be boring, but I got really excited about it once I started doing it," Mitchell said. "Now I really enjoy it."

The Whitefish native is growing bacteria for a project that could lead to a remedy for people who've gotten a type of staph infection called Staphylococcus aureus. The infection can affect people with weakened immune systems or artificial implants. Mitchell, an MSU senior majoring in chemical engineering, is involved in the project as part of the university's Undergraduate Scholars Program.

"I enjoy the people that I work with, and I enjoy seeing the reason we are doing the research and where it's going and how it might be beneficial to medicine eventually," Mitchell said.

Mitchell is applying now to medical schools. He's interested in biomedical engineering, too. But his outlook on research has changed so much, that he could otherwise pursue a career in research.

If he does go into research, Mitchell said he might want to take on projects with a little broader focus than his current work.

When Mitchell isn't studying or analyzing proteins, he may be spending time with his new wife (he and Sarah Bent of Whitefish were married Jan. 4), playing guitar, hiking, backpacking or skiing.

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For more information, call 994-5607 or visit www.montana.edu/wwwvr.

Book on collaboration debunks writing myth

by Carol Schmidt
Communications Services

Linda Karell, professor of English at Montana State University, would like to debunk the myth that writing is a solitary endeavor.

"Like most things in life, writing is collaborative," Karell said.

Karell puts forth her theory in a book of criticism, "Writing Together/ Writing Apart: Collaboration in Western American Literature" published recently by the University of Nebraska Press.

Like most things in life, writing is collaborative, said MSU English professor Linda Karell. (MSU photo/Linda Best)

The Livingston native, who now teaches Western literature at MSU, uses the works of eight Western writers to demonstrate her theory that all writing has roots of inspiration outside the writer.

While it may seem odd that Karell studied collaboration in an area of writing known for celebrating the rugged individualist, Karell argues that is precisely her purpose, for she believes collaboration can be found in all forms of writing.

"What people have called influence and inspiration might be called collaboration," Karell says. "What I was interested in looking at is the question of how writing comes to be. How do you nail down meaning?"

Karell's book looks at many types of collaboration, studying writers who openly spoke of collaboration (Louise Erdrich and her deceased husband Michael Dorris) as well as including writers of memoirs or autobiography that would seem not to be collaborative (works by Mary Austin, Ivan Doig, Mary Clearman Blew and William Kittredge). Even writers telling their own story depend on some type of collaborating, she believes.

"When we pass down a family story we are collaborating," Karell says. "A writer might have an experience that he or she writes about, but when the writer joins with the written character and the reader, she or he is collaborating. I am arguing that collaboration is something we do always, when we write 'alone' or with others. And we also collaborate when we read others' writing."

Karell said her research on collaboration in writing was rooted in a study of women's storytelling several years ago. She started thinking about how storytelling is an exercise of collaboration — stories are passed down from one storyteller to the next and the storyteller collaborates with their readers and listeners. It occurred to her that at the time there was no language for the combination of memory and imagination that makes writing and storytelling possible. In the word collaboration, Karell found an anchor to study the phenomenon she had been researching.

Her thinking on the subject began to take shape when she considered "Angle of Repose," Wallace Stegner's Pulitzer Prize-winning novel. In discussions of that book, Stegner said he "borrowed" the story from the life of a real person, western writer and artist Mary Hallock Foote. Karell wondered if this famous retelling of another family's story was fictional license, as Stegner argued, or whether it was plagiarism, as some critics have claimed. The work troubled her until she decided that her evaluation could be clear if she researched Stegner's work as a collaboration. While she believes that collaboration is inherently neither positive nor negative, in the end she sides with critics who fault Stegner's irresponsibility in redrawing an actual person — particularly as the book of fiction negatively impacted the real character's survivors.

"For me, the most compelling reason to keep collaboration in mind is its undeniable explanatory power," Karell writes. "It helps make sense of the process of reading and writing in a way that the idea of the individual author does not. It literally helps fill in the gaps."

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