

Big Dipper's Binary Star Has Surprises

There's more to the Big Dipper than meets the eye.

In ancient times, people with exceptional vision discovered that one of the brightest stars in the Big Dipper was, in fact, two stars so close together that most people cannot distinguish them. The two stars, Alcor and Mizar, were the first binary stars—a pair of stars that orbit each other—ever known.

Now Rochester astronomer Eric Mamajek has discovered that Alcor, one of the most studied stars in the sky, is actually two

stars. Mamajek, an assistant professor of physics and astronomy, led a team that made the discovery using computer algorithms to remove as much glare as possible from the image of a star in the hopes of spotting a planet near the star.

"Finding that Alcor had a stellar companion was a bit of serendipity," says Mamajek. "We were trying a new method of planet hunting and instead of finding a planet orbiting Alcor, we found a star."

Modern telescopes have found that Mizar is itself a pair of binaries, revealing what

was once thought of as a single star to be four stars orbiting each other. Alcor and its newly identified companion, Alcor B, are apparently gravitationally bound to the Mizar system, making the whole group a sextuplet.

Mamajek is continuing his efforts to find planets around nearby stars, but his attention is not completely off Alcor and Mizar.

"Some of us have a feeling that Alcor might actually have another surprise in store for us," he says.

—Jonathan Sherwood '04 (MA), '09S (MBA)

BIG DIPPER

For millennia, stargazers have recognized that what seemed to be the brightest star in the Big Dipper was made up of more than one star.

Alkaid

Mizar and Alcor

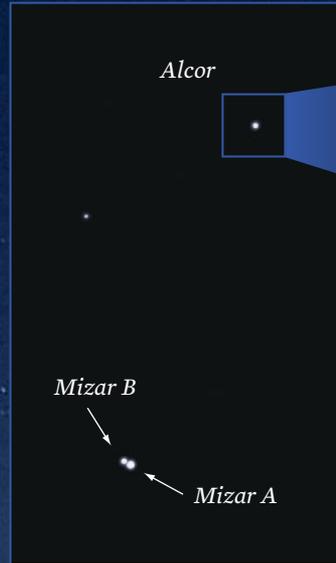
Alioth

Megrez

Phecda

Merak

Dubhe



Alcor

Mizar B

Mizar A

MIZAR AND ALCOR

As astronomers were able to look more closely at the binary stars known as Mizar and Alcor, they discovered an even larger set of stars, including two sets of binaries orbiting each other to make up Mizar.

CITATIONS

Research Roundup

NEWLY SEQUENCED WASP GENOME MAY HAVE MANY USES

Scientists led by John Werren, a professor of biology, and Stephen Richards of the Genome Sequencing Center at the Baylor College of Medicine have sequenced the genomes of three parasitoid wasp species, a project that could be useful for pest control and medicine. Because parasitoid wasps seek out and kill specific kinds of insects, understanding their genetics and evolution could help in the development of alternatives to chemical pesticides. The study was published in *Science*.

STUDY LOOKS AT PLACEBO EFFECT AS PART OF TREATMENT

Medical Center researchers used the placebo effect to treat psoriasis patients successfully with one quarter to one half of their usual dose of a widely used steroid medication. According to an early study published online in the journal *Psychosomatic Medicine* and led by Robert Ader, the George L. Engel Professor of Psychosocial Medicine, the Rochester team hope to explore whether treatment regimens can be designed that mix active drugs and placebos to maximize drug benefits, reduce side effects, and extend the use of drugs otherwise limited by addiction risk or toxicity.

DRUG SHOWS PROMISE FOR HUNTINGTON'S DISEASE

An early stage clinical trial indicates an experimental drug may improve cognition in people with Huntington's disease, according to a study led by Karl Kieburtz, a professor of neurology, and published in the *Archives of Neurology*. Mitochondria—the part of the cell that helps convert food to energy—are believed to play a role in the development of Huntington's. The experimental drug dimebon (latrepirdine) stabilizes and enhances mitochondrial function, a result that has been shown to improve behavioral, cognitive, and functional outcomes in Alzheimer's disease. Scientists speculate that it may have the same effect in patients with Huntington's.

SIMPLE SCREENING COULD BRING EARLY INTERVENTION FOR CHILDREN

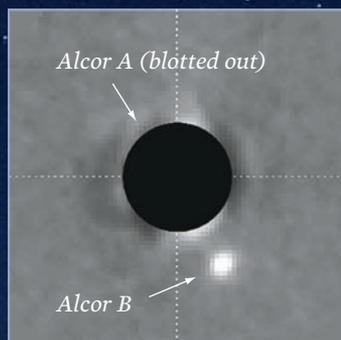
The addition of a simple and systematic screening among children in foster care doubled the detection rate of developmental disabilities in a population that is at high risk for developmental problems, according to a study published in *Pediatrics* by Sandra Jee, an assistant professor of pediatrics. A brief, nondiagnostic questionnaire sent to foster families a week before well-child visits took providers less than five minutes to score and review with families. The screening also revealed more delays in problem-solving, personal-social, and fine motor skills than had previously been detected.

TAG-TEAM APPROACH BREAKS GENE THERAPY SIZE BARRIER

Rochester neuroscientists have forged an unlikely molecular union as part of their fight against diseases of the brain and nervous system. The team has brought together the herpes virus and a molecule known as “sleeping beauty” to improve a treatment technology known as gene therapy, which aims to manipulate genes to correct for molecular flaws that cause disease. The work—led by William Bowers, an associate professor of neurology, and published online in *Gene Therapy*—has allowed Rochester scientists to reach a long-sought goal: shuttling into brain cells a relatively large gene that can remain active for an extended period of time. The breakthrough opens more diseases to possible treatment with gene therapy.

STUDY LINKS VITAMIN D, RACE, AND CARDIAC DEATHS

Vitamin D deficiency may contribute to a higher number of heart attacks and stroke-related deaths among black Americans compared to whites, according to a Rochester study led by Kevin Fiscella, an associate professor of family medicine and community and preventive medicine, and published in the journal *Annals of Family Medicine*. A complex host of genetic and lifestyle factors among blacks may explain why the population group has lower vitamin D levels over the course of their lifetimes compared to other races. The analysis suggests that vitamin D may be a modifiable, independent risk factor for heart disease.

**ALCOR AND COMPANION**

Using computer algorithms, Rochester astronomer Eric Mamajek and his team wondered if a planet could be orbiting Alcor. Instead they found that it had its own companion star, given the name Alcor B.