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What has been your favorite research area?
The first stars and galaxies. We know the universe was denser and
hotter than the Milky Way or the Sun at early times, so these familiar objects
couldn’t have existed forever.

We are privileged to live in a time when we can explore critically the story of genesis (how
the universe started and developed) with direct observations. Because of the finite time it takes
glory to travel to us from distant sources, we can see images of the universe when it was younger by
looking deep into space through powerful telescopes.

I started to work on the first galaxies 2 decades ago when only a few theorists were inter-
ested in the field. It is gratifying to see an explosive evolution of this frontier now, with the
potential of a wealth of new instruments under construction.

I just finished writing a popular book, How Did the First Stars and Galaxies Form? (Princeton
University Press), that describes the latest developments in this field, which should come out in
spring 2010.

What are some cool things you’ve done in your career?
In 1992, I was a postdoctoral fellow at Princeton. My neighbor,
Andy Gould, was working on the phenomenon of gravita-
tional microlensing by stars.

One day I asked him, “Have you considered the effect of planets on
the microlensing light curve?” Andy said, “No, but I suspect the effect would be
small.” An hour later, he rushed back to my office and said: “The
effect is surprisingly large! Let’s write a paper on the subject.”

Today, microlensing is one of the major techniques used for
discovering new planets and the

only one that works at large distances across the galaxy.

Then, one morning in 2001, while taking a shower, I started
wondering what the accelerated expansion of the universe might
mean for future observers. Within a day, I submitted a short
paper about it to Physical Review entitled “Long-Term Future of
Extragalactic Astronomy.”

My paper showed that as soon as the universe ages by a factor of 10, all the distant galaxies we
now see will have exited from our horizon. The only galaxy visible to us will be the merger
product of the Milky Way and Andromeda. This paper received a lot of attention in the media.

What do you like to do in your spare time?
I enjoy spending time with my two girls and wife and fixing
things at home. I also enjoy watching the sky at night from
our porch. It gives me the sense that we humans are too often
preoccupied with ourselves. There is much more to the uni-
verse than meets the eye around us on Earth.

Astroideas
Where is the study of galaxy evolution going?

Quite a few puzzles confront astronomers studying galaxy
evolution. Among them is why some galaxies have
gassy, dusty disks that form stars while other galaxies lack disks and
have not formed stars in billions of years. Could one type of galaxy
evolve into the other?

Important clues come from galaxies whose spectra indicate recent,
but not current, star formation. Their stars’ positions and motions suggest these galaxies had disks that were
interrupted in mergers with other gal-
axies. We are working to learn

whether such mergers are the domi-
nant mechanism by which many gal-
axies are similarly transformed. If
mergers are important, then a lot of
galaxy evolution must take place
where mergers are most common, in
gravitationally bound groups of gal-
axies somewhat more dense than
our own Local Group.

Another way galaxies could
evolve, especially in the early uni-
verse, is by accreting gas from their
surroundings. This inflowing gas
allows galaxies to form stars.

Unfortunately, it is difficult to
measure inflowing or outflowing gas

in a distant galaxy, at least using its
brightest spectral line, because the
path light takes at that wavelength in
escaping the gas is ambiguous.

My colleagues and I are using some of
the world’s biggest telescopes to
detect other spectral lines that are
cleaner tests of gas inflows and out-
flows. We hope to obtain new insight
into the role of gas accretion in the
development of galaxies.

Ann Zabludoff
Associate professor of astronomy at the University of Arizona in Tucson