Research Interests
Bender’s research involves studies of biogeochemistry and paleoclimate. Much of his work involves measuring the changing concentration and isotopic composition of O\textsubscript{2} in air on various timescales, and using the results to characterize the fertility of ecosystems and to study Earth’s climate history.

Bender’s group measures the O\textsubscript{2} concentration of air in samples collected for them biweekly at remote sites between Antarctica and Alaska. Rapid mixing in the atmosphere allows them to use O\textsubscript{2} concentration changes as measures of rates of net production (photosynthesis minus respiration) on the scale of a hemisphere. Seasonal variations in the O\textsubscript{2} concentration primarily reflect the productivity of the ocean biosphere. The change in the O\textsubscript{2} concentration from one year to the next reflects the fate of fossil fuel CO\textsubscript{2} which does not remain in the atmosphere: how much dissolves in the oceans, how much is incorporated into land plants? O\textsubscript{2} is relevant because it is produced when plants grow, but not when CO\textsubscript{2} dissolves in seawater.

Areas of Expertise
Biogeochemistry and paleoclimate

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