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Elementary: the chemical fingerprints of massive galaxy formation over cosmic time

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Propositions
accompanying the thesis

Elementary: The chemical fingerprints of massive
galaxy formation over cosmic time

1. Age and metal gradients in today's massive early-type galaxies were already in place by $z \sim 1$ (*Chapter 2*).
2. A major overhaul of the assumptions underlying stellar population synthesis models is required (*Chapter 3*).
3. Massive quiescent galaxies at $z \sim 2$ may quench inside-out, followed by minor mergers building up their outskirts to destroy rotation, steepen metallicity gradients, and flatten age gradients (*Chapter 4*).
4. The most massive distant quiescent galaxies have bottom-heavy initial mass functions, increasing their inferred stellar masses by a factor of 2 - 4 (*Chapter 5*).
5. The race to the highest redshift is compelling, but galaxy evolution can only be understood via detailed studies at redshifts where such scrutiny is possible.
6. There is untapped potential in archival data, especially if one can find creative ways in which to manipulate them beyond their originally intended purposes.
7. Models are only as good as their input data and assumptions.
8. Networking, marketing, and a surprising amount of luck are crucial to a successful career in science, contrary to what we are led to believe.
9. Contributing to the social atmosphere of an institute is equally as important as contributing to the scientific environment.
10. When your work lives in your head, your hobby should live in your hands.
11. While there are many benefits, pursuing an academic career is accompanied by unseen costs. Women pay more than men; women from racial and ethnic minorities pay the most.
12. Never underestimate the power of Shrek in bringing people together.

Chloe M. Cheng
Leiden, 25 June 2026