



Engineering your Career: Sustainable Time Management for ECRs

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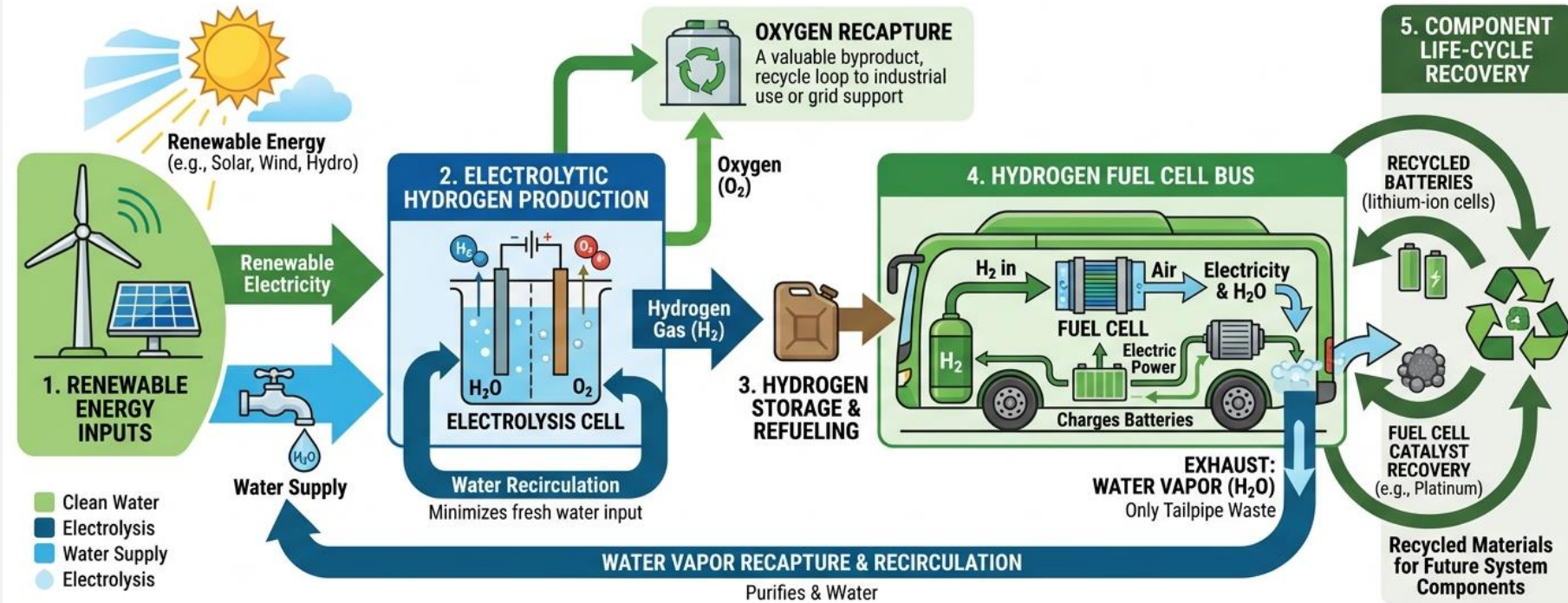
Professor Rachael Rothman

- Co-Director of UK-HyRES
- Co-Director Grantham Centre for Sustainable Futures
- Director South Yorkshire Sustainability Centre
- Lead UK LCA Network
- Other current projects on:
 - Reusable plastics
 - Thin film manufacturing
 - Clean maritime
- Teach two modules (Life Cycle Thinking & Assessment and Chemical Engineering Design)
- Academic Lead for Sustainability at University of Sheffield



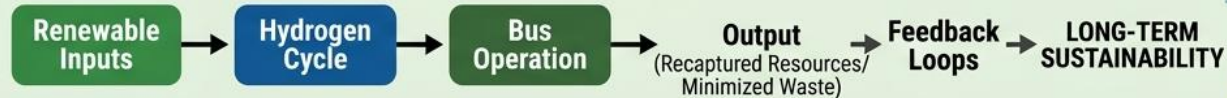
System Sustainability

SUSTAINABLE HYDROGEN BUS SYSTEM CYCLE: CIRCULARITY, INPUTS & WASTES



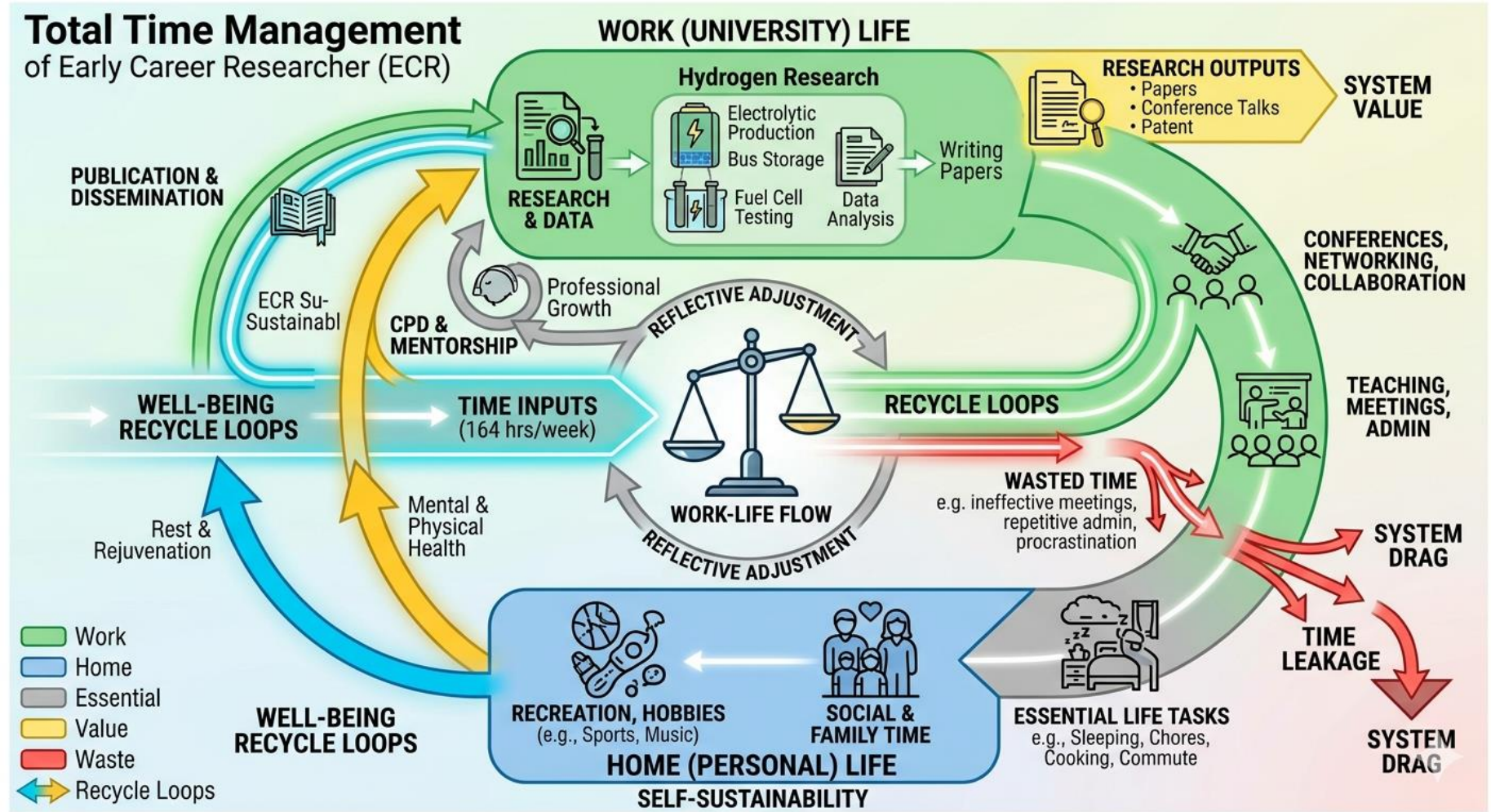
MINIMIZED RESOURCE USE
 (e.g., Recycled Water)

6. SYSTEM SUSTAINABILITY SUMMARY



NEARLY ZERO AIR POLLUTION EMISSIONS
CLOSED-LOOP MATERIAL FLOWS

Your System Sustainability



The Modern Research Landscape

- In today's competitive landscape, over-production can easily become the default setting

- More research to do
- More presentations to write
- More courses to attend
- More training to do
- Better get some teaching practice in
- Need to try to write a grant...

- Leads to resource depletion (tiredness and burnout)
- System shocks: the jump from UG → PhD → PDRA → is a massive jump in system complexity (and independence)

The collage consists of three main visual elements:

- Handwritten Mind Map (2000):** A central node labeled '2000' is surrounded by four categories:
 - PSYCHOLOGICAL:** Be prepared for major races; TOTAL control and focus.
 - PHYSICAL:** Be able to maintain under 7 min/km for classic race; Be able to run with max effort in all races.
 - TECHNICAL:** Less than 3 mins mistakes; 90% control accuracy.
 - PERFORMANCE GOALS:** Top 10 Juovac (shorter class); Top 20 Juovac (other); Top 6 relay; Top 2 major domestic races W20; Top 10 major domestic senior races; Top 5 European Junior Cup.
- Handwritten Notes:**
 - PHYSICAL (continued):** min 6 hours running/week; weights/circuits at least once; terrain runs; hills/intervals; long runs - 2/week.
 - GOALS FOR THE FUTURE...:** World cup teams 2002; World champs team 2003.
 - TECHNICAL (continued):** Relocation - Paris exercises; Visualization - map memory, studying maps; Traffic lights - practice at local events; Distance judgement - practice when training (in terrain); Accurate compass - training in vague area/terrain only; Fine Navigation - complex areas, short legs; Control flow - practice at events; Route choice - study maps, practice.
- Calendar Grid:** A monthly calendar grid for August, September, October, November, and December, with handwritten notes and colored blocks indicating events or training sessions.
- Data Grid:** A grid of numerical data points, possibly representing performance metrics or training logs, with some cells highlighted in color.

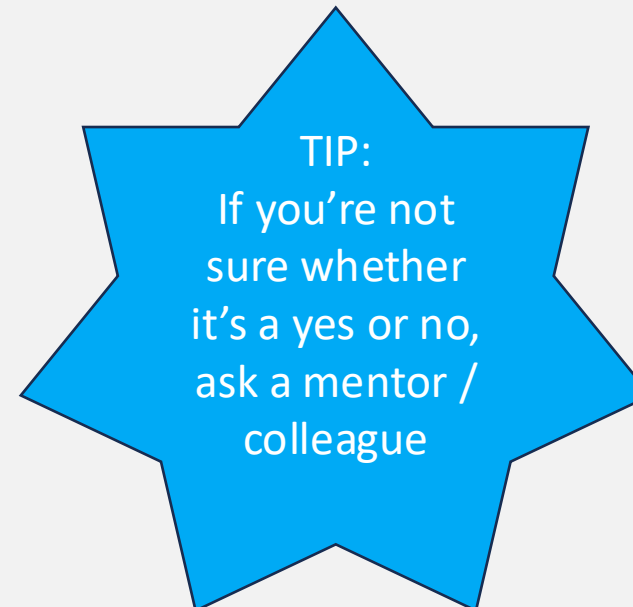
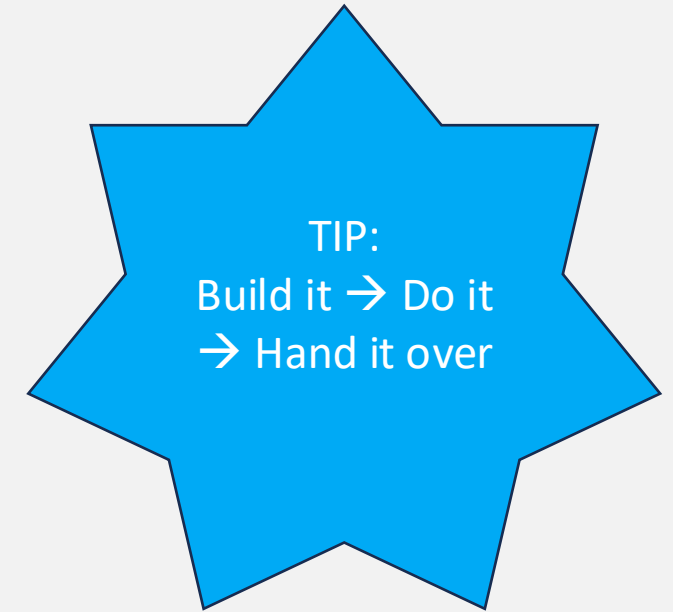
The Resource Depletion Model

- Time is finite. Energy is the variable.
- Cognitive load is energy draining
- Energy balance is key
- If you switch tasks too frequently, you lose energy
- Make a plan
 - What should you be spending your energy on?
 - How can you prioritise tasks?
- Deep work blocks can help to give focus
 - What helps you focus?



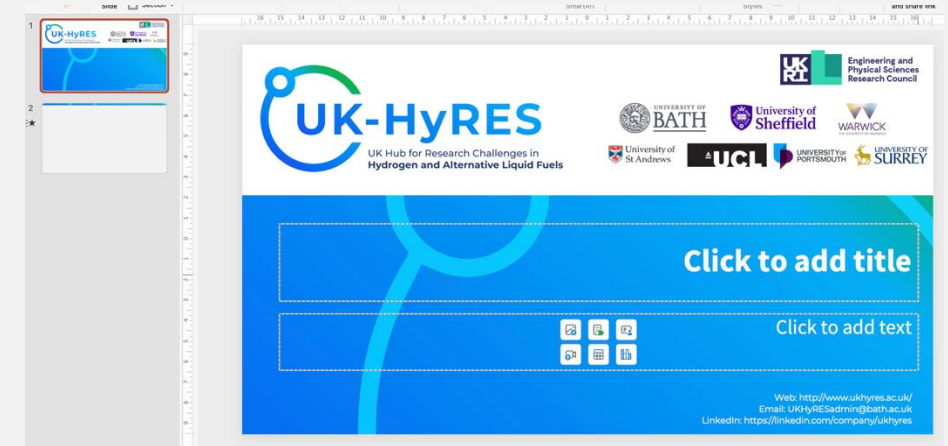
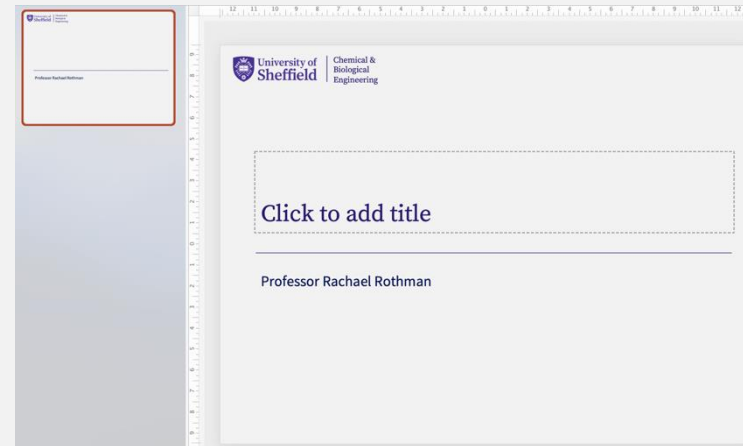
Strategic Growth v Scope Creep

- Not all tasks are created equal
 - The 80/20 rule: 20% of your activities will drive 80% of your career progression
- “No” to something is “yes” to something else
 - Does it offer visibility?
 - Does it align with your 5 year plan?
 - Is there someone else better suited?
- This applies to personal life as well



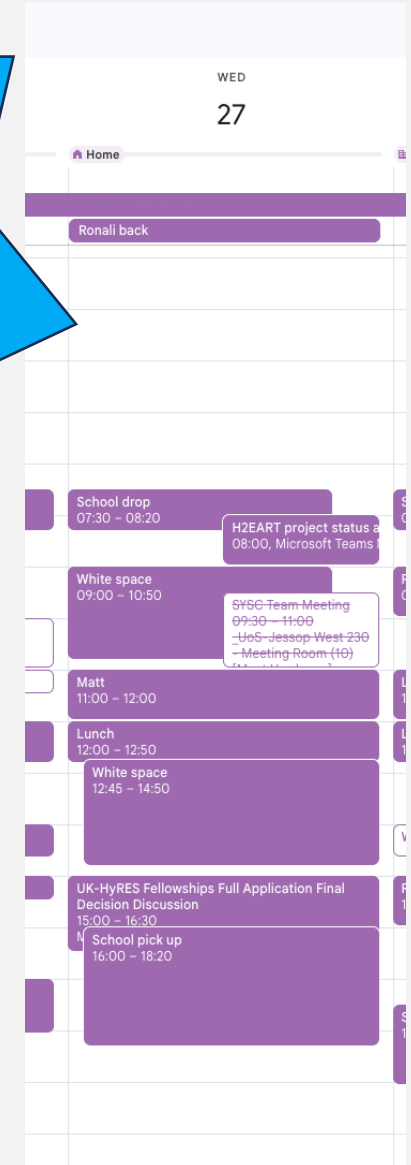
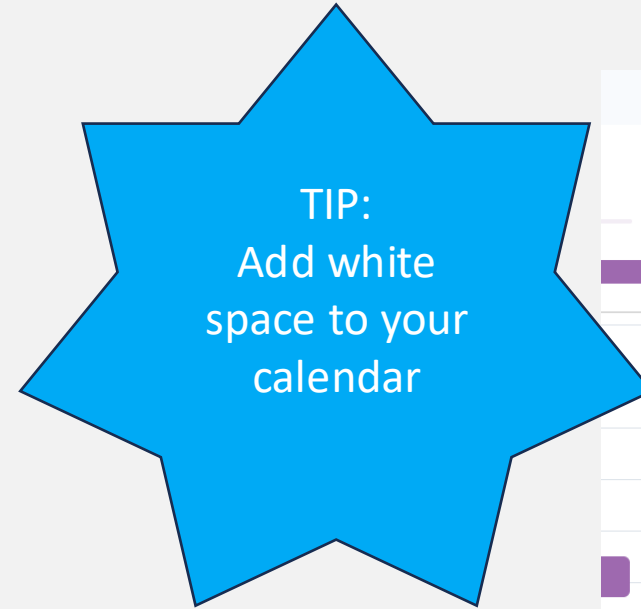
The Zero-Waste Workflow (“Professional Recycling”)

- Maximise the outputs from your time inputs by recycling
- Lower the activation energy of tasks
 - Create templates etc.



Engineering Resilience

- A system running at 100% capacity is a system waiting to fail
 - Leave 15-20% of your week white on the calendar
- System maintenance is important
 - What is your non-negotiable maintenance? How does it make you a better researcher?
 - Know yourself
- Own your choices and be happy with them



The Sustainable Career Audit (part 1)

Review your past week... how many of these Sustainability Standards did you meet?

1. Cognitive Optimization

- Protected Deep Work:** I successfully held at least two 3-hour blocks for my primary "knowledge product" (writing, analysis, or design).
- Single-Tasking Focus:** I avoided the "mental friction" of multi-tasking by closing email/messaging apps during intense research periods.
- Admin Batching:** I consolidated routine tasks (expenses, scheduling, minor emails) into a single, low-energy window.

2. Strategic Investment

- Intentional Boundaries:** I declined or delegated at least one request that did not align with my primary career development goals.
- High-Impact Prioritization:** I dedicated my peak energy hours to the 20% of tasks that yield the highest professional ROI (e.g., grants or publications).
- Visible Contribution:** I ensured my "service work" (committees or peer reviews) was both impactful for my field and recognized by my mentors.

The Sustainable Career Audit (part 2)

3. Resource Recovery (The Circular Model)

Output Recycling: I repurposed at least one piece of work for a second use (e.g., turning a lab report into a paper draft or a teaching module).

Workflow Automation: I used (or created) a template or a standard process for a recurring task to reduce future "startup" time.

4. System Resilience

Buffer Capacity: I kept at least 15% of my weekly schedule unassigned to accommodate the inevitable "system spikes" and emergencies.

Formal Shutdown: I practiced a daily "shutdown ritual" to clear my cognitive load and ensure a clean break between work and rest.

Essential Maintenance: I treated sleep, physical movement, and social connection as non-negotiable infrastructure for my productivity.

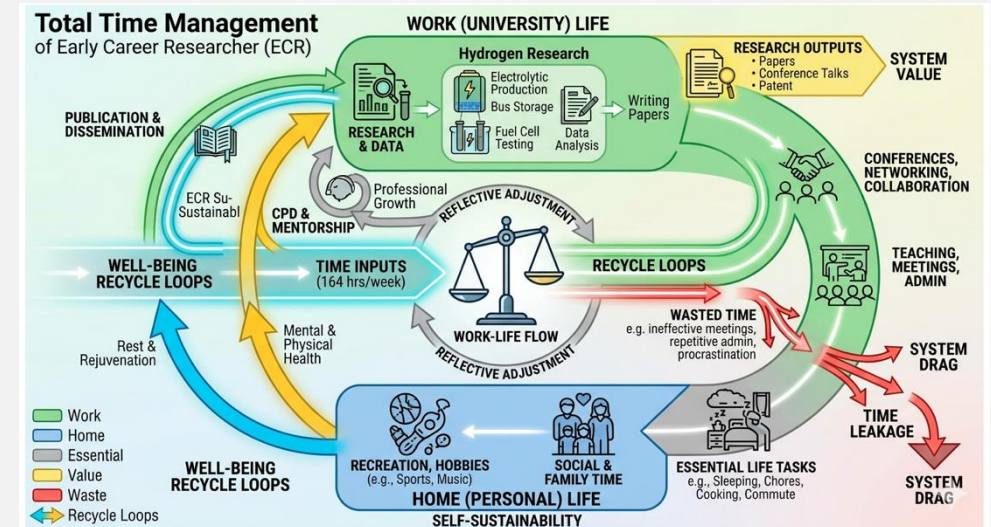
Add up your ✓

Sustainability Score:

- **10–12 Checks: Optimal Performance.** Your system is highly efficient and built for the long term.
- **7–9 Checks: Stable but Strained.** You are productive, but minor "leaks" are costing you energy.
- **Under 6 Checks: System Critical.** Your current pace is unsustainable; it's time to re-engineer your workload.

Summary

- Your career is a marathon not a sprint
 - Engineering it for sustainability is the only way to win
- Make a plan (or many plans!)
- Prioritise tasks – what is important (which isn't always the same as what is easy or enjoyable!)
- Don't be scared of difficult tasks/conversations
- Take opportunities that arise, but also say no
 - If you're not sure ask a mentor, supervisor, colleague etc.
- Enjoy the journey



Good luck!

