

HARRIET GROOM

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RESEARCH EXPERIENCE

College Assistant Professor, Stanley Elmore Research Fellow in Biomedical Sciences, Sidney Sussex College (Sept 2020-2025), hosted by Dr Nick Matheson, CITIID

Only recipient of prestigious mid-career (Henslow) and senior (Stanley Elmore) stipendiary research fellowships, awarded in competition across the biological sciences based on track record and research plans. Lead projects focussed on the genetic and molecular basis of intrinsic antiviral immunity.

- Determining the mechanism of our newly-described **antiviral protein CHD1L** (BHIVA project grant)
- Collaboration with Matheson group to validate and characterise an **unreported target of HIV-1 Vpr** with implications for HIV-1 pathogenesis (inc. supervision of part II and summer students)
- **SARS-CoV-2 N binds to the 5'UTR** causing structural remodelling (*in prep*, Supervision of a part III student who achieved a high 1st, collaboration with Hang Shi, Tsinghua Strategic Partnership grant)
- Exploiting knowledge of **SAMHD1 and CHD1L antiviral mechanisms for therapeutic impact** (NIHR and ViiV healthcare)

Henslow Research Fellow, Downing College, hosted by Professor Andrew Lever (Oct 2015 – Sept 2019)

Associate PI, Department of Medicine, University of Cambridge

(including parental leave/out of lab for 15 months, Visiting Fellow Oct 2019-Aug 2020)

- Characterised a **novel antiviral protein** in African HIV patients. (**In press at *Nature***, co-investigator on awarded **MRC research grant**)
- Analysed the role of viral **RNA structures in SARS-CoV-2 transcription (published)**
- Analysed *samhd1* genotype data in >11,000 individuals with **Cambridge BioResource**; the largest study of its kind.
- Demonstrated that antiviral protein SAMHD1 perturbs mitochondria, key for future therapeutic interventions (collaboration with Antonella Spinazzola, UCL), manuscript *in prep*
- Spear-headed a collaboration with Benedikt Kaufer, Freie Universität Berlin, to determine if perturbation of mitochondrial function occurs during human herpesvirus-6 infection. [*parental leave for 5 months*]

MRC National Institute for Medical Research/Francis Crick Institute (NIMR, PI Dr Kate Bishop)

Career Development Fellow, May 2009 – Dec 2013, **Investigator Scientist**, Jan 2014 – May 2015

- Demonstrated that retrovirus, XMRV, is absent from healthy and patient cohorts.
- Showed that XMRV is susceptible to relevant human anti-viral proteins. Both of these studies were **key in demonstrating that XMRV is not a human pathogen** and contributed to the later retraction of the original study linking the virus to disease in humans.
- Established **prostate cancer** screens for other relevant pathogens (*trichomonas*, BKV, HPV)
- Delineated the **function and regulation of antiviral protein SAMHD1, a landmark paper in the field**
- Characterised SAMHD1's interaction with HIV-2 Vpx, key to the understanding of viral counteraction measures to restriction and to the ongoing efforts to target this interaction therapeutically

University of Cambridge

PhD student, Dept. of Medicine (Supervisor: Professor Andrew Lever), Jan 2006–Apr 2009

- Revealed the contribution of HIV-1 Gag and Rev proteins to translation of the viral RNA.
- Demonstrated that Rev stimulates viral translation and authored a key review, highly cited

Masters student (Supervisor: Professor Andrew Lever), Oct 2004-Apr 2005

Biochemical investigation of a potential packaging signal in human immunodeficiency virus type-2

Final year project student (Supervisor: Dr Chris Smith), Oct-Dec 2003

Alternative splicing of genes with unusually long AG dinucleotide exclusion zones (published).

Nuffield bursary student (Supervisor: Professor Chris Howe), Jul-Sep 2002

Investigation of evolutionary genetics of *Amphidinium operculatum*. (presented at Plastid Review, 2003)

GRANTS, FELLOWSHIPS AND AWARDS

- Successful Milner Consortium bid leading to **pharmaceutical collaboration** (CDA pending)
- **BHIVA research project grant** (£9k, 2023)
- BSI inclusion grant– used to organise a half day conference highlighting inclusive research (2023, £500)
- **Tsinghua - Cambridge Joint Research Initiative grant** for SARS-CoV2 structure project (2021-2, £20k)
- **Stanley Elmore Research Fellowship**, Sidney Sussex College to fund salary and academic expenses (2020-2025, >£150k)
- **Co-PI MRC research grant** awarded with Prof Lever, Dr Sandhu, and Dr Mok (3 yr, funds PDRA + RA, **£800k, 2019-22**). Co-wrote the grant, involved in recruitment decisions. Oversaw running of the research project including day-to-day and strategic supervision of staff, progress meetings, supervision of MPhil. Also dealt with difficult personnel issue, leading a mediation, and resolving a working relationship
- Downing College **Henslow Research Fellowship**, 2015-9: to fund salary and academic expenses (>£80k)
- Cambridge Biomedical Research Centre **Pump Prime Award**, 2017: £10k (software and consumables)
- **Competitive research grants** from the Evelyn Trust and Rose Trees Trust Research, Ita Askonas collaboration fund 2016: total £45k (consumables/travel).
- Travel and inclusion grants for conference attendance (Biochemical Society, Microbiology Society)
- Interview stage for Henry Dale Fellowships (2015, 2016), first reserve for MRC CDA (2015)
- Selected for MRC achievement-related pay award (2010)

RESEARCH SUPERVISION AND LEADERSHIP

- Sought professional development through **Postgraduate Certificate in Research and Innovation Leadership** (passed with **distinction** 2022)
Modules comprised: Building a research vision and identifying core values, Using entrepreneurial skills as a research leader, Managing research projects and leading successful teams, and Leading engagement and impact in academia and beyond.
- Secondary supervision/mentorship of 2 PhD students (Matheson lab 2022-present)
- Delivered the opening of CITIID **HIV BSL3**, manage facility and train new users
- Day-to-day supervision of **two PDRA, one RA/MPhil student** (MRC grant, 2019-22)
- Design and supervise projects for part II/III NST and MVST **students** (2016-present).
- Previously supervised technician, resulting in *Nature* paper and international project students (NIMR)
- Selected for and participated in **Emerging Research Leaders' Development Programme**
- **Cambridge-Africa THRiVE mentor**, part of capacity-building and knowledge-exchange partnership with Makerere University. Mentored student through successful application and fellowship

INVITED AND SELECTED TALKS (*session chair) – attendance/posters not listed

Seminars

- CITIID seminar series 2023
- Inclusive Research Showcase (School of Clinical Medicine, **organiser**, speaker 2022)
- Postdoc presented at Microbiology Society 2022
- Huawei/Globescan: Sustainability and Resilience webinar speaker 2020
- Roslin Institute, University of Edinburgh, 2017
- Cambridge BioResource Open Evening, 2017
- University of Cambridge, Department of Medicine, 2015, Department of Pathology, 2016, 2023

Conference talks

- British Society for Immunology annual conference 2022 invited speaker and panel (declined)
- Cambridge Tsinghua Joint Research Initiative Fund workshop 2022
- Cambridge Infectious Disease Symposium 2016, 2022
- Recently Independent Virology Researchers meeting annually 2016-23 including session chair in 3 years
- Microbiology Society Conference 2007, 2008 (offered paper), 2016*, 2018, (2020 cancelled), 2021
- Selected in internal competition to present at Department of Medicine Research Day, 2017
- Frontiers in Retrovirology meeting 2013
- Cold Spring Harbor Retrovirus meetings 2010, 2011, 2013
- Third European Congress for Virology 2007

EDUCATION: University of Cambridge (2001 – 2009, 2021-2)

Postgraduate Certificate in Research and Innovation leadership (distinction, awarded full bursary)

PhD Molecular Virology, MSci Natural Sciences (Biochemistry); 2.1, BA Natural Sciences; 2.1

FORMAL TEACHING, ACADEMIC MENTORSHIP AND EDUCATIONAL LEADERSHIP

- **Part II Virology Retroviral restriction/Hepatitis B Virus lecture** (one lecture, 2020-present, **12/16 students gave 4/4 feedback** in 2022), examination essay setting and marking
- **HIV and Influenza lectures** (2 lectures and Q&A session, 2020-present) for Institute for Continuing Education (PGCert in Infectious Disease, excellent feedback)
- **Designed, lead, and evaluated first “Preparation Week”** to prepare undergraduates for the transition to university (coordinated delivery, delivered sessions, budget £30k, 2022 planning 2023). Presented at **Cambridge Intercollegiate Forum**.
- **Supervision of NST IA Biology of Cells** for Downing (2006-7, 2015-19), Jesus (2018-9), Homerton (2015-6) and Sidney Sussex (2020-present) Colleges (consistently 4-5/5 in feedback questionnaires). Examiner for internal mocks, **build and maintain VLE** for Sidney Natural Scientists
- **Teaching Associates Programme 2018**, FHEA application in progress
- **Director of Studies for Biological Natural Sciences** (Sidney Sussex 2020-, Downing College, Apr 2016-Mar 2017, ~20 students). Lead DoS and budget holder in NSTB at Sidney Sussex
Oversee and advise on the academic progress of students, arrange supervisors, write references, organise careers and study skills sessions, open days and outreach, strategic leadership of subject.
- Academic co-lead for **study skills/inreach programme** at Sidney Sussex alongside **Supervisor community of practice** initiative (beginning 2023)
- **Practical Demonstrator** for part IB Pathology course (2006-7)

ACADEMIC SERVICE AND ADMINISTRATION

Academic

- **Virology Division member for Microbiology Society** (Annual conference co-organisation 2023,4)
- **Reviewer** for UKRI (MRC) and Research Grants Council of Hong Kong COVID-19 funding calls
- Selection panel for **junior research fellowship competition** Sidney Sussex 2021
- [The Biochemist](#) **editorial board member** 2017-2021
- **Peer review** for several specialist journals, including *Retrovirology*, *J Gen Virol*, *Viruses*
- **Selection panels** for Sidney Sussex Mastership and Head of Student Wellbeing interviews, 2021/2
- Interview panel member for postdoc, PhD and MPhil candidates (Dept. Pathology, 2016-present)
- Selected as **Group Mentor for international [Shaping Horizons](#) programme**: “action programme on science, policy and innovation”. Includes leadership training and mentoring of groups prior to presentation of a solution to a global challenge at the summit (2019)
- Selected for and participated in the [Royal Society Pairing Scheme](#)

Educational/pastoral

- **Postgraduate tutorship** (2022-present)
Involved in strategic and day-to-day oversight of postgraduate community at Sidney Sussex: admissions, awarding and management of studentships, research funding allocation, risk register and reporting to committees and college Council, monitor and approve CamSiS reports, support individual students through wide-ranging tutorial issues (procedural, financial, personal, academic)
- Undergraduate Natural Sciences **admissions** (2014-present, ~45 candidates p.a.)
- Downing College **undergraduate Tutor** (pastoral support to >70 undergraduate students, 2016-7), asked to continue to cover a colleague’s sabbatical leave. Dealt with several challenging situations including fitness to study proceedings, disciplinary matters and successful appeal procedures
- Natural Sciences **dissertation prize selection committee** (Downing College 2016-2022)
- Only supervisor selected to join Faculty of Biology **course review panel** (2017-8), contributed to thorough report with progressive recommendations
- Expert reviewer for [Undergraduate Awards](#), selecting outstanding undergraduate research (2018)

Committees

- **Postgraduate tutors committee** – informed and contribute to discussion around postgraduate landscape in intercollegiate Cambridge (2022-present)
- Elected to Sidney Sussex **College Council** and **Education and Pastoral Care Committee** (2021-present). The former involves being a trustee and making strategic decisions for the college and latter involves discussion and decision making on academic governance and pastoral support in college.
- **Governance board** for Sidney Sussex Student Wellbeing Project (£1m budget, recruitment panel for Head of Student Wellbeing)
- **Student awards committee** - allocate funding and prizes (2022-present)
- **Outreach Steering Group**, Downing College, contributing to access strategy and events (2017-8)
- Elected to Downing College **Education Committee**, leading academic governance of College (2016-8)
- Governing Body, Downing College (2015-2020)
- Elected to Downing Alumni Association, providing means to support current students (2017-)
- Selected for collaborative spaces working group (Francis Crick Institute, 2013-4)
- Postdoc committee (NIMR, 2011-13), including organising 2 retreats
- Vice Chair of graduate student conference committee (2008), organised inaugural conference
- Student representative on Faculty Graduate Committee (2007-8)

OUTREACH, WIDENING PARTICIPATION AND IMPACT

- **Press release** currently being held on embargo for paper *in press* at *Nature*
- **Widening participation**: Deliver interactive seminars on undergraduate admissions, genetics/virology workshops through College outreach and access initiatives, with excellent feedback (2015-present)
- Ongoing engagement through **social media** (sought out and engaged in social media training)
- Interviewed for “Soundtrack to my Science” CSCI Engage 2023
- Henslow Fellowship [video interview](#) for Cambridge Philosophical Society, 2022
- **Pint of Science** talk and collaborated with local artists for sci-art on my work ([Creative reactions](#), 2020)
- Featured in year-long Cambridge Philosophical Society **anniversary exhibition and popup lecture**
- Downing College Outreach Steering Group
- Downing College graduate-fellowship liaison lecture 2018
- Westminster School research and admissions lecture 2018
- Colchester County High School research and admissions lectures 2017
- Engaged the public through NIMR and Francis Crick Institute outreach schemes, judged student essays competition, Schools’ Days and judged local school's science fair (*attracted media coverage*)
- As graduate student, interacted with school children through “I’m a scientist get me out of here”, demonstrated the nature of DNA at the Big Bang Science Fair
- Campaigned for a handwashing emoji during recent pandemic – adopted with media coverage

PROFESSIONAL MEMBERSHIPS

- Microbiology Society (Virology Division, co-organiser, session chair of Annual Conference 2023, 2024)
- Member of the Royal Society of Biology, Chartered Biologist
- Biochemical Society (EDI champion 2021), British Society for Immunology

For publications see overleaf. **Total citations 1854** (source google scholar)

PRIMARY RESEARCH PAPERS (excluding in prep, * joint corresponding author, ¹ jointly placed authors)

- Tsai MHC, Caswell SJ*, Morris ER*, Manna MC, Pennell S, Kelly G, **Groom HCT**, Taylor IA, Bishop KN Attenuation of reverse transcriptase facilitates SAMHD1 restriction of HIV-1 in cycling cells. *Retrovirology* 20:5 2023
- McLaren PJ¹, Porreca I¹, Gennaro Iaconis¹, Mok HP¹, Mukhopadhyay S¹, Karakoc E¹, Pomilla C, Bartha I, Ciuffi A, Thorball CW, Tough RH, , Carstensen T, Segun F, Porter T, Jarvis I, Skarnes WC, Bassett A, DeGorter MK, Moorthy MPS, Bashirova A, Buchbinder S, Carrington M, Cossarizza A, De Luca A, Goedert JJ, Goldstein DB, Haas DW, Herbeck JT, Johnson EO, Kaleebu P, Kirk GD, Kootstra NA, Kral AH, Lambotte O, Luo M, Mallal S, Picado JM, Meyer L, Miro JM, Moodley P, Motala AA, Mullins JI, Obel N, Pirie F, Plummer FA, Poli G, Price MA, Theodorou I, Walker BD, Winkler CA, Wolinsky SM, Zagury J-F, Montgomery SB, Dougan G*, **Groom HCT***, Lever AML*, Gurdasani D*, Sandhu MS*, Fellay J* Africa-specific human genetic variation in CHD1L regulates HIV-1 *Nature in press*
Functional characterisation of CHD1L, supervised training of new staff to conduct revision experiments, analysed data, edited revised manuscript, co-wrote successful funding application to MRC. Expecting high press coverage
- D'souza AR, Buckingham AB, Salasc FE, Ingemarsdotter C, Iaconis G, Jarvis IJ, Lever AML, **Groom HCT***, Kenyon JC* Duplex formation between the template and the nascent strand in the transcription-regulating sequences determines the site of template switching in SARS – CoV-2 2021 *RNA Biol*
- Ordonez P, Bishop KN, Stoye JP, **Groom HCT** Analysis of SAMHD1 Restriction by Flow Cytometry in Human Myeloid U937 Cells. *JoVE* 2021 doi: 10.3791/62502
- Ordonez P, Kunzelmann S, **Groom HCT**, Yap M, Weising S, Meier C, Bishop KN, Taylor IA SAMHD1 enhances nucleoside-analogue efficacy against HIV-1 in myeloid cells 2017 *Sci Rep* 7:42824
Developed assays required for restriction phenotype characterisation
- **Groom HC**¹, Arnold LH¹, Kunzelmann S, Schwefel D, Caswell SJ, Ordonez P, Mann MC, Rueschenbaum S, Goldstone DC, Pennell S, Howell SA, Stoye JP, Webb M, Taylor IA, Bishop KN Phospho-dependent Regulation of SAMHD1 Oligomerisation Couples Catalysis and Restriction 2015 *PLoS Pathog* 11(10):e1005194 (¹ joint first authorship)
- Schwefel D, **Groom HCT**, Boucherit VC, Christodoulou E, Walker PA, Stoye JP, Bishop KN & Taylor IA Structural basis of lentiviral subversion of a cellular protein degradation pathway 2014 *Nature* 505(7482):234-8
Associated "News and Views", supervised technician and carried out key cellular work to validate structural data
- **Groom HCT**, Warren AY, Neal DE, Bishop KN No evidence for infection of UK prostate cancer patients with XMRV, BK virus, *Trichomonas vaginalis* or human papilloma viruses 2012 *PLoS One* 7(3):e34221
- Goldstone DC, Ennis-Adeniran V, Hedden JJ, **Groom HC**, Rice GI, Christodoulou E, Walker PA, Kelly G, Haire LF, Yap MW, de Carvalho LP, Stoye JP, Crow YJ, Taylor IA, Webb M HIV-1 restriction factor SAMHD1 is a deoxynucleoside triphosphate triphosphohydrolase. 2011 *Nature* 480(7377):379-82
Mentioned on BBC news and in MRC coverage, overcame technical difficulties to quantify dNTPs in cell lysates, essential for demonstrating enzyme activity in cells, >900 citations
- **Groom HCT**, Bansal AS, Boucherit VC, Stoye JP, Bishop KN 2011 *Retrovirology* (Primary paper, >1 year's work, accepted but withdrawn due to patient consent withdrawal – happy to elaborate at interview)
- **Groom HCT**, Yap MW, Galão RP, Neil SJ, Bishop KN Susceptibility of xenotropic murine leukemia virus-related virus (XMRV) to retroviral restriction factors 2010 *Proc Natl Acad Sci U S A* 107(11):5166-71
- **Groom HCT**, Boucherit VC, Makinson K, Randal E, Baptista S, Hagan S, Gow JW, Mattes FM, Breuer J, Kerr JR, Stoye JP, Bishop KN Absence of xenotropic murine leukaemia virus-related virus in UK patients with chronic fatigue syndrome 2010 *Retrovirology* 7:10
- **Groom HCT**, Anderson EC, Dangerfield J, Lever AM Rev regulates translation of Human Immunodeficiency Virus Type-1 RNAs. 2009 *J Gen Virol* 90(Pt 5):1141-7
- Gooding C, Clark F, Wollerton MC, Grellscheid SN, **Groom H**, Smith CW A class of human exons with predicted distant branch points revealed by analysis of AG dinucleotide exclusion zones 2006 *Genome Biology* 7(1):R1
Cloned mutant plasmids required for project

REVIEW ARTICLES AND COMMENTARIES

- **Groom HCT** Inclusive research: making science represent all individuals, *Immunology News* 2022
- **Groom HCT**, Bishop KN The tale of xenotropic murine leukemia virus-related virus 2012 *J Gen Virol* 93:915-24
- **Groom HCT**, Anderson EC, Lever AM, Rev: beyond nuclear export 2009 *J Gen Virol* 90(Pt 6):1303-18
- **Groom HCT** Peer Review: fundamentals and the future *Wiley Exchanges*
- **Groom HCT** The Breastfeeding Biochemist: Planning Pumping and Perfectionism *Biochem (Lond)* (2020) 42 (3): 22–28