Paul Tadrous

Histopathologist, image-analysis researcher and microscope designer

Paul Joseph Tadrous is a UK-based medical histopathologist, image-analysis researcher, programmer and microscope designer. His career combines diagnostic practice with research into what optical images reveal about tissue. His published work includes a practical histopathology handbook, algorithms for finding bacteria and separating stains, and studies of three-dimensional cellular structure. He later developed the open-source PARDUS microscope-automation system and PUMA, a modular microscope whose custom mechanical parts can be made with a desktop 3D printer. He reports retiring from clinical practice in 2023; research, teaching, software and instrument development continue through his Harrow businesses TadPath and OptArc. [1], [2], [3], [4].

He is best understood as a person with several overlapping working lives. In a hospital, histopathology means examining material removed from patients and helping clinicians decide what disease is present. In his research, the slide becomes an optical and computational problem: how to distinguish structures, restore blurred information, or search a large area systematically. At the workshop bench, those questions become stage mechanisms, light paths, circuit boards, firmware and instructions that somebody else must be able to follow. His record is unusually accessible at that last level: the public documentation contains unsuccessful arrangements, compatibility problems, alignment advice and revisions, alongside finished images. [5], [6], [7].

The available evidence is much fuller about his professional practice than his childhood or domestic life. His handbook’s dedication remembers his father, Joseph Zaki Tadrous, who died in March 2007. It offers no basis for reconstructing an upbringing or migration history. [8].

Learning medicine and learning to measure images

Tadrous’s own account begins with medical qualification at the London Hospital Medical College, Whitechapel, in 1992, followed by an MSc in histological and histochemical image analysis at the Royal Postgraduate Medical School, Hammersmith. It places pathology training successively at St Mary’s, Northwick Park and St Mark’s, Hammersmith, Charing Cross, and the London Hospital and St Bartholomew’s, and Royal College of Pathologists fellowship in 2004. [9]. The MSc year is disputed: the company gives 1993, while his indexed professional profile says qualification in 1994. Individual hospital-training intervals remain unverified. [10].

His computational work was already visible in the 1990s. A sole-authored 1995 paper on

directional edge detection in noisy images appeared in Pattern Recognition. Detecting an edge means deciding where image intensity changes in a way that marks a boundary rather than random variation. It is a practical prerequisite for counting, measuring and isolating structures, and places his later microscopy software within a long involvement in image processing rather than a sudden move into coding after retirement. The bibliographic record establishes the paper; it does not, by itself, reveal how he learned programming or who taught him. [11], [12].

In 2000 he published three reviews in the Journal of Pathology on imaging living tissues and cells: optical coherence tomography, fluorescence lifetime imaging, and confocal microscopy with micro-radiology. Their contemporary affiliation was Imperial College's histopathology department at Hammersmith Hospital. These were surveys of developing techniques, not claims to have invented them. Together they show the breadth of his early interests: depth information, light emitted by tissue, and ways of distinguishing structures beyond the ordinary stained section. [13], [14], [15].

His PhD concerned advanced tissue imaging. A later paper cites a 2003 thesis at University of London (Imperial College), titled The imaging of benign and malignant breast tissue by fluorescence lifetime imaging and optical coherence tomography. The title gives a precise account of his formation: he was investigating whether physical properties of tissue images could help distinguish biological states. Independently published papers establish that he subsequently worked at Northwick Park, and a 2018 publication explicitly identifies him as a consultant in histopathology there. [16], [17], [18].

These qualifications belong to different kinds of competence. Medical training concerned patients, specimens and accountable diagnoses; the MSc and PhD concerned quantitative and optical methods. Neither makes the other dispensable. A useful interpretation of his later career is that he repeatedly brought questions from diagnostic work into instrument and algorithm design. That is an inference from the dated work, rather than evidence of a single lifelong plan.

A hospital pathologist among physicists and cancer researchers

The 2003 breast-tissue fluorescence-lifetime study places Tadrous within a specific collaboration. He was first author alongside Jan Siegel, Paul M. W. French, Sami Shousha, El-Nasir Lalani and Gordon W. H. Stamp. The work used unstained, alcohol-fixed specimens from thirteen patients and analysed 167 tissue regions. Fluorescence lifetime concerns how rapidly light emission decays after excitation, rather than simply how bright an image looks. The study reported differences among tissue types, including benign and malignancy-associated stroma, and proposed further investigation. The collaboration joined histopathology and photonics expertise in a feasibility experiment. Coauthorship does not establish doctoral supervision or mentorship. [19], [20].

He also participated in research where imaging was part of a larger biological argument. A 2006 Hepatology paper by Pamela Vig, Francesco P. Russo and colleagues, including Tadrous, reconstructed the relationship between oval cells and small hepatocyte-like cells in a mouse model of chronic liver injury. Serial sections and three-dimensional reconstruction helped researchers examine spatial continuity that individual flat sections could obscure. Its setting was experimental liver regeneration, not a demonstrated treatment for human patients. [21].

The 2014 Cell Reports study of crypt and stem-cell evolution in the human colon widened the network again. Tadrous was one of thirteen authors, with Ann-Marie Baker, Biancastella Cereser, Trevor A. Graham, Nicholas A. Wright, Benjamin D. Simons and others. The affiliations joined hospital cellular pathology, Barts cancer research, Cambridge physics, Oxford mathematics and University College London. Naturally occurring mitochondrial mutations provided a way to trace cell populations in human tissue, where experiments possible in genetically engineered mice are unavailable. Tadrous's listed affiliation was Northwest London Hospitals NHS Trust; the paper does not make him the project's sole investigator. A 2019 correction also belongs to its publication history. [22], [23]. His biography also reports a completed, undated three-year honorary senior lectureship at Barts Cancer Institute's Centre for Tumour Biology. [24].

The clinical work continued alongside such projects. A 2018 report with maxillofacial clinicians Barzi Gareb and Michael Perry concerned localised amyloid in the parotid gland. Imaging and cytology had not settled the diagnosis; surgical removal and tissue examination established it. The paper identifies Tadrous as the consultant histopathologist alongside the maxillofacial clinicians. This modest case report locates him in ordinary cooperation between specialties, where a specimen, an uncertain clinical picture and a report have immediate consequences for a patient. [25].

Writing a book for the person sitting at the microscope

Tadrous's Diagnostic Criteria Handbook in Histopathology: A Surgical Pathology Vade Mecum was first published by Wiley on 8 January 2008, with copyright dated 2007. The publisher identified him with the Histopathology Unit at Cancer Research UK in London. A corrected reprint followed in September 2008; a later ebook listing dated 2011 should not be mistaken for a different book. Its intended reader was a working pathologist or a trainee with an existing foundation, needing quick access to diagnostic criteria, grading systems, scoring, frozen-section advice and laboratory practice. [26], [27].

The preface describes a recognisable work situation: the pathologist already has a short list of possible diagnoses but needs the distinguishing morphological points without repeatedly searching long passages in a reference textbook. The answer was lists, tables, diagrams and specialised indexes. Its acknowledgements show how the material was assembled through exchanges with colleagues: they posed questions and answered his queries, often about individual patients. He credited the Pathological Society of Great Britain and Ireland with

helping bring the book to press, and named advisers including Ashish Chandra, H. Terry Cook, Amar P. Dhillon, Cyril Fisher, Andrew M. Hanby, Stefan G. Hübscher and Günter Klöppel. [28].

The book’ s significance for this profile is practical. Tadrous was not only making new images; he was organising existing knowledge so that it could be retrieved under workload. A microscope image still needs a trained interpreter, criteria and an institutional context. His companion website provided a place for supplementary information and feedback, although its copyright range is insufficient evidence that every chapter remains current. [29].

Programming around the laborious parts of pathology

His 2010 study of computer-assisted screening for mycobacteria began with a mundane difficulty: bacilli can be extremely sparse in a stained tissue section, and searching for them is laborious. He developed an algorithm using 1,000 training images and evaluated it on another 2,000. Rather than merely issuing a diagnosis, it ranked images by the likelihood of containing bacilli and produced maps showing candidate locations for a human observer. The paper reported promising performance despite staining artefacts, while describing savings of time and money as a potential benefit. The design is important: it aimed to direct limited human attention towards likely evidence. It did not demonstrate an autonomous clinical service or a reduction in staffing costs. [30].

A separate 2010 method tackled digital stain separation. Routine pathology staining makes structures distinguishable to human eyes, but mixtures of colours complicate automatic measurements. Tadrous proposed extracting stain components from ordinary digital images without requiring specialised hardware or predefined pure-stain colours. This connects histological preparation to computation: the algorithm must contend with images already made by a laboratory process, rather than idealised objects drawn for a computer. [31].

Another strand concerned deconvolution: estimating a less blurred object from an image and a model of how the optical system spreads light. His 2010 Journal of Microscopy paper proposed generating a point-spread function from a through-focus stack of a thin specimen for three-dimensional brightfield restoration. A 2012 sole-authored study then applied this kind of processing to chromatin inside human interphase nuclei. The method combined optical sectioning, restoration, segmentation, standardisation and three-dimensional display. [32], [33].

The chromatin paper is revealing about the mechanics and limits. It used thicker tissue sections, a high-power oil-immersion objective and closely spaced focus steps; the researcher then isolated nuclei and processed volumes with BiaQIm and FATCAM software. Its comparison involved six hepatocyte and six plasma-cell nuclei. Three-dimensional views suggested that familiar two-dimensional descriptions, such as the plasma cell’ s clock-face chromatin, could conceal more complicated spatial arrangements. That is a small

methodological demonstration, not a validated diagnostic test across a population. The very fine spacing of sampled voxels should also not be confused with equivalent optical resolution. [34].

His software work remains public after retirement. The BiaQIm Image Processing Suite, or BIPS, downloads page was updated on 13 October 2024. It describes a suite written in C under GPLv3, including a graphical image-processing application, more than 200 Biaram command-line programs, FATCAM for three-dimensional visualisation and Histocytometer for cell counts and proportions. Source and builds are supplied for several operating systems. This is a continuing body of work rather than software mentioned once in an old paper. It also entails a particular working style: command-line tools, reusable routines and explicit processing steps, alongside graphical interfaces. [35].

On his deconvolution website, Tadrous explains both the possibilities of restoration and the difficulty of knowing whether a sharper image is more truthful. He offers experimental, open-source tools while distinguishing the support an individual investigator can supply from a commercial software service. That distinction has economic force: free access to code does not automatically provide training, guaranteed results or somebody on call to solve a user’s problem. [36].

What an automatic image can and cannot establish

In “On the concept of objectivity in digital image analysis in pathology”, published in Pathology in April 2010, Tadrous argued that a deterministic algorithm’s repeatability is not the same as objectivity. Human decisions enter into algorithm design and into specimen, block, slide and field selection. Different algorithms can vary just as observers vary. The point was not that measurement is futile, but that a machine’s numerical output does not erase the choices that produced it. This was written before the present prominence of generative AI, and belongs to the practical problem of using measurements responsibly in pathology. [37].

His August 2023 essay comparing deconvolution with AI deblurring returned to the question of evidence. He distinguished restoration based on an image and optical constraints from learned procedures that may supply plausible details from external training. It is an author’s argument and an invitation to discussion, not a universal experimental verdict on every AI system. Reading it as opposition to all computational assistance would also be misleading: his earlier bacterial-search work, current slide-annotation services and programmable microscope projects all engage with automation. A narrower, supported interpretation is that he wants the provenance of apparent detail and the limits of a method to remain inspectable. [38], [39].

One small forum exchange makes this concern concrete. In January 2023 a user asked about a peculiar Fourier transform of a point-spread function. Tadrous investigated the submitted image, finding that white screenshot borders and block-like pixel sampling could

generate features mistaken for optical information; another contributor, Douglas Talley, also helped resolve the problem. His explanation used cropping and transformations to distinguish an imaging artefact from a property of the microscope. The episode shows ordinary technical assistance: asking what data actually entered the calculation before interpreting an attractive graphic. [40].

TadPath, OptArc and the conditions of independent work

Tadrous dates TadPath's founding to 2014, in Harrow, as an academic histopathology consultancy and equipment supplier. Its present services turn his professional training into specific paid tasks: tissue processing, sectioning, staining, expert annotation, scoring and quantification, and custom image-analysis work for research, pharmaceutical and AI projects. Immunostaining and molecular work may involve external linked laboratories. The current service page explicitly says its laboratory does not provide clinical diagnostic work. The name "Diagnostics" is therefore insufficient grounds for describing his present business as a patient-diagnosis service. [41], [42].

This is also a distinction between institutional periods. The Care Quality Commission independently records a TadPath service run by Dr Paul Joseph Tadrous, registered on 31 October 2018 and archived on 23 March 2022. It says the service was not inspected. Archival means that the location ceased to be part of the provider's registration; the page does not explain why. It establishes neither a disciplinary story nor his personal retirement date. [43].

The practical arrangements are those of customised work. TadPath asks clients to agree quotations, timescales and specimen delivery; routine operations can be priced per section or stain. It does not maintain a continuously staffed reception for unscheduled deliveries. Its quality page describes microscopic checking of slides, servicing and audits, and a management system based on ISO 15189, while expressly stating that the laboratory is not UKAS accredited. The supported picture is a service that specifies its scope and procedures, not an independently accredited facility merely because it invokes a standard. [44], [45].

OptArc makes the physical-instrument side more legible. Its account describes a small Harrow business with a workshop, 3D-printing laboratory and optical work, selling directly online rather than through a high-street shop. It says printing, assembly, testing and calibration take place locally in the UK; payment and postal or courier delivery connect the workshop to customers. Products and capabilities include microscopes, cameras, telescope and microscopy components, reagents and custom software. Its biographical page also records Tadrous's work with applied-optics groups at Imperial and the University of Kent in Canterbury, without dates or precise appointment titles. [46].

Some commissions extend beyond routine histology. TadPath advertises serial-section reconstruction, virtual representations of liver microvasculature, CT-based three-dimensional printing and a research method for reducing metal artefacts in CT images. It explicitly separates anatomical models from implants or surgical cutting guides and its

research software from approved clinical use. These examples establish the breadth of the service offered; they do not independently establish adoption, comparative performance or clinical approval. [47].

There is no public basis here for assigning Tadrous an income, sales volume, pension, staff count or private source of wealth. What can be described is the mixture of arrangements: a former clinical career, customised research services, assembled instruments, freely distributed designs and software, and voluntary donations. His February 2023 account says he had borne prototype, documentation, website and related costs himself, and had recently added Patreon and PayPal support. Ready-built instruments offer users a way to pay for assembly and checking, while open files let others undertake that labour themselves. The evidence shows possible channels of support, not their financial sufficiency. [48], [49].

PARDUS: starting with an existing microscope

Before PUMA's journal publication, Tadrous was building automation around a conventional instrument. His PARDUS prototype was working in mid-2019, according to the project's historical account; a 2020 Pathological Society abstract described an affordable open hardware and software system for standard microscopes. PARDUS stands for Programmable, Affordable, Remote-controlled Drive Utility Standard. The early demonstration used a 1975 Zeiss Standard microscope, motorised axes, a Raspberry Pi and camera feedback. It addressed a specific limitation of expensive whole-slide scanners: they were not necessarily an economical or suitable route to live, three-dimensional or specialised imaging. The abstract reported repeat positioning within five micrometres in the prototype, and envisaged autofocus, bacillus screening and three-dimensional processing. Those are reported engineering results and proposed applications, not independent clinical validation. [50], [51].

The choice to retrofit a standard microscope is revealing. It treats an old, serviceable optical instrument as something that can acquire new functions rather than become obsolete when automation is needed. The hard part lies in the connection between components: commands must reach motors, positions must be detected, the camera must return images, and the user must be able to run a sequence. It is a software-and-control problem as much as a mechanical one. This interpretation follows the architecture described by Tadrous; it does not imply that every old microscope is straightforward to automate. [52].

The system subsequently changed substantially. The current Codeberg documentation, last edited 4 September 2026, says a major refactoring was completed that year. The original Raspberry Pi performed several roles at once and handled one camera; Tadrous wanted a more scalable arrangement and less dependence on a single computer supplier. The revised implementation separates a server, client and command-script interpreter, actuator firmware, camera servers and the Aperta aperture-control system. It can distribute cameras

across computers and use a standard PC with an Arduino or similar interface. In November 2022, he had already announced PARD Capture, the image-capture component, separately to the Microlist community. [53], [54].

In September 2026 he archived the GitHub PARDUS repository and pointed users to Codeberg for active work. That matters when reconstructing the current project: an archived GitHub page is a migration record, not proof of abandonment. It also cautions against treating a 2020 abstract, a 2022 software release and the 2026 architecture as interchangeable descriptions. [55], [56].

PUMA: making the whole optical instrument

PUMA moved from modifying a microscope to providing the microscope itself. A prerelease was deposited on Zenodo on 6 April 2021; the sole-authored Journal of Microscopy paper first appeared online on 21 June 2021 and was published in the September issue, volume 283, pages 259–280. Its author’ s affiliation was TadPath Diagnostics in London. PUMA expands to Portable, Upgradeable, Modular, Affordable. These words describe design choices rather than four independently measured achievements. The journal publication documents the instrument and demonstrations; it does not certify every subsequently added module. [57], [58].

The basic form is recognisable to a working microscopist: an upright instrument with direct viewing through an eyepiece, replaceable professional objectives and a mechanical stage. A camera or screen can be added, but direct observation does not depend on a phone, network connection or external computer. In his October 2021 FocalPlane presentation, Tadrous explained how the same system could support Köhler illumination, an Abbe condenser, polarisation, darkfield, fluorescence and other modes through interchangeable components and accessible illumination planes. For a non-specialist, the point is that changing how light enters or leaves a specimen can reveal different kinds of structure; magnification alone is not the whole instrument. [59].

Two more unusual features are the augmented-reality projector and spatial light modulator. The projector introduces digital markings into the optical view: a grid, pointer, timer or calibrated measurement can appear with the specimen while the observer continues looking through the eyepiece. The light modulator uses a small programmable display to shape illumination apertures. These are different operations—one adds information to the view, the other changes the illuminating light—and they should not be collapsed into a generic claim of an AI microscope. The 2021 paper presents them as a platform for programmable imaging. Later applications require their own methods and evidence. [60], [61].

In an April–May 2022 forum discussion, Tadrous identified himself as a practising clinical pathologist and explained why he favoured combining digital capabilities with an optical view. His preference came from his experience of examining specimens; it was not

evidence that every pathologist should choose the same arrangement. He also invited correction about related designs. That exchange locates the design in an actual user’s habits: the instrument preserves an activity he already knows while adding ways to annotate and control it. [62].

The June 2021 DIY parts estimates were £47.17 for a basic configuration, £79.36 for an epi-fluorescence configuration and £173.18 for an advanced arrangement. These exclude the investment in acquiring tools and skills. In the advanced example, optics cost £97.64 and printed plastic £13.88: inexpensive structural manufacture still depends on suitable optics and alignment. These are historical estimates. [63]. The module-by-module bills of materials identify quantities, weights and sourcing options; suggested marketplace links are not quality guarantees. [64].

The original instrument has stage wobble and backlash, restricted specimen space around its three posts, a single objective without a conventional turret, and optics requiring careful alignment. The project states that PUMA is for research and education and has no approval for clinical or veterinary diagnosis. Its appeal lies in a system a user can build, inspect and modify, with tradeoffs visible. [65].

[External image / 外部圖片] Two photographs of black 3D-printed PUMA microscopes, one with electronic modules and one in a simpler configuration.
Two PUMA microscope configurations photographed for the project documentation. The instrument can range from a compact direct-view scope to a system with electronic and optical additions. Paul J. Tadrous / PUMA documentation · GNU Free Documentation License 1.3 (project documentation) · Image source

What “open” requires in the workshop

Tadrous built the mechanical designs with FreeCAD. In his February 2023 guest essay for the FreeCAD project, he argued for open, editable models rather than a temporary free licence to proprietary software. His concern was the future ability to modify and share a design without depending on changing commercial terms or inaccessible file formats. The distinction between an editable parametric model and an STL mesh is substantial: a mesh describes a final printable surface, while the model retains dimensions and construction relationships that a later user can change. He acknowledged bugs and limitations in FreeCAD rather than treating it as frictionless. [66].

The model notes reveal the work hidden by the phrase “3D-printed microscope”. Different suppliers’ nominally similar lenses can have different curvatures or dimensions; some cheap spherical lenses are unsuitable substitutes. Lens holders have been revised with spring loading and access for removal. FreeCAD version changes can also alter recomputation or export behaviour, so documentation specifies workarounds and compatible versions. A design is therefore maintained against both physical variation and software change. Its continuing usability depends on notes as well as shapes. [67].

Electronics add another layer. The control software runs the optical overlays, illumination functions and focus motor; it modifies existing graphics libraries to deal with the image orientation produced by the light path. Displaying readable text through a reflecting optical arrangement can require mirrored glyphs. The firmware also defines everyday interactions: homing the focus axis, presenting measurement tools, counting or timing, and signalling faults. These are not glamorous additions, but they determine whether the apparatus can be operated predictably. Published instructions credit modified Adafruit graphics code and Pawel Hernik's display library, identifying a dependence on other people's open software rather than a completely isolated invention. [68], [69].

The project's contribution rules make its intended audience and maintenance burden explicit. New designs should work on inexpensive or mid-range filament printers, use common hand tools and broadly obtainable components, and include editable FreeCAD sources, printing orientation and assembly or operating instructions. They should avoid requiring a lathe, specialist machining or a custom component obtainable from only one supplier. Contributions are voluntary; the rules do not promise payment. This is a maintainership role: Tadrous determines what belongs in the project and what information a contributor owes the next builder. Availability means more than a file being downloadable. It involves tools, supply chains, tolerances, explanation and permission to modify. [70].

Those supply chains are transnational even though his documented training and workshop are British. The bills of materials point users towards generic fixings and electronic or optical parts from several suppliers, including online marketplaces. A builder may depend on local hardware shops, imported components, a shared laboratory printer, and borrowed objectives. The geography of this practice is consequently not established by travel biography: it is visible in how a British design draws on global manufacturing and circulates through international repositories and microscopy forums. [71], [72].

Teaching, builders and ordinary exchanges

One builder, Julien Guizetti, described using a laboratory printer available through one of his master's students. The build involved two hardware-store trips, a wait of more than two weeks for marketplace deliveries, several days of printing and further assembly. Expensive optical parts were borrowed, with thanks to Vibor Laketa. The result could image blood smears, and Guizetti hoped to use it for outreach. This is evidence of a particular build and its effort, not a survey of adoption or clinical suitability. It gives useful substance to "affordable": a small expenditure on structural parts can coexist with institutional access to a printer and good optics. [73].

Other users encounter the design less smoothly. In March 2024 a beginner asked how to obtain STL files and whether all the models should be printed. Tadrous replied that one must first choose a configuration, then follow instructions for individual components and their printing requirements. That short exchange exposes a real educational task: a

modular repository is not a single object waiting for one click. The maintainer has to help a reader turn a collection of options into a buildable instrument. [74].

His forum presence is not restricted to promoting PUMA. In an October 2021 discussion about imaging snow, he identified his expertise as pathology, suggested several illumination possibilities and acknowledged that he had not tried placing PUMA directly on snow. He referred to crystals encountered in pathological material rather than claiming glaciological experience. In January 2023, advising a novice choosing a first microscope, he pointed towards reviews and user communities while disclosing his own interest in PUMA. These moments suggest a teacher who connects an unfamiliar question to what he knows, but also states where that knowledge ends. They support a description of public conduct, not a claim about his private character. [75], [76].

In an August 2023 optics discussion, he described publishing C-programming tutorials so viewers could understand later material on diffraction and image processing beyond elementary ray optics. This is consistent with the documentation’s demands: the intended audience includes people willing to learn the apparatus’s underlying workings, not only purchase a result. His educational work takes several forms—formal papers, a clinician’s handbook, explanatory websites, videos, source comments and replies to questions—and reaches different readers through each. [77].

PUMA has also received attention outside its author’s channels. Kerry Stevenson chose it as Fabbaloo’s “Design of the Week” on 9 May 2022, carrying its story to the 3D-printing audience. That enthusiastic article largely drew on the project and its demonstrations; it was not an independent performance test. A 2022 specialist review, The Field Guide to 3D Printing in Optical Microscopy for Life Sciences, placed PUMA within a wider landscape of printed instruments. These are different kinds of reception: maker publicity, technical classification and actual user building should not be counted as the same evidence. [78], [79].

Retirement opened a new phase, rather than ending the practice

His February 2023 FreeCAD essay already called him retired from clinical work while still active in research. [80]. The post-clinical phase builds on earlier work: edge detection, optical imaging, deconvolution and automated searching had been present for decades. The significant change is the institutional setting and allocation of time, rather than the invention of a new technical identity.

A series of 2025 design updates shows what the new phase involved. On 14 May he presented an adaptable specimen holder intended to accommodate Petri dishes, multiwell culture plates and circuit boards, remove the original three focus posts, and permit arrangements with an objective below the specimen. At that point the CNC module was still unfinished. Another post discussed substituting standard rail or aluminium-extrusion arrangements for a printed carry handle, questioning the long-term reliability of a load-

bearing printed part. A further example offered an Arduino Mega interface assembled from ordinary modules without requiring builders to solder a custom circuit board. The common issue was durability and access to components, not merely adding another spectacular imaging mode. [81], [82], [83].

PUMA's 27 September 2026 README update calls the XYZ CNC stage completed; older passages lower down still describe earlier plans and limitations. [84]. The original instrument, unfinished 2025 module and subsequent completed stage therefore belong to different moments. Development continues, while the sources still give no basis to infer sales or regulated clinical deployment.

The resulting portrait is of a pathologist whose work repeatedly crosses the boundaries between seeing tissue, deciding what it means, making measurements, and building the apparatus that permits the measurement. Hospital laboratories, London cancer research and applied optics supplied distinct settings and collaborators. A handbook addressed the difficulty of retrieving criteria; algorithms addressed the labour of searching and measuring; software exposed processing steps; open hardware transferred part of instrument manufacture to users. This connection is an interpretation supported by the work, not a hidden motive reconstructed from sparse biography.

His independent practice remains dependent on institutions and other people's labour even when the code and designs are authored alone. Tissue preparation, optical components, graphics libraries, printers, specialist colleagues, journal review, community explanations and users' borrowed equipment all contribute to what can be done. His amateur and educational microscopy grows out of decades of professional tissue work, and his workshop carries that history into a different setting. The current scale and personal finances remain largely outside the public record.

Source note and unresolved questions

This profile was researched 3 October 2026. Publisher and indexed primary papers anchor research dates, affiliations and results; the CQC record anchors one service-registration history. Company pages, repository histories, guest essays and forum posts are primary evidence for Tadrous's own account and current work, but do not independently verify every qualification, funding statement or performance claim. Third-party coverage has been used for reception rather than certification. Sources were sought in English and with relevant multilingual search terms; no substantial independent non-English biography was located.

The public record consulted does not settle the MSc award-year discrepancy, exact hospital-training intervals, doctoral supervision, dates of the Barts honorary term, current professional registration, workshop staffing, sales or income. It supplies little reliable childhood or family history beyond the handbook dedication. These gaps have been left open. The profile also distinguishes demonstrated prototypes from proposed applications,

research software from approved medical devices, and former clinical work from present academic and commercial services.

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1. TadPath biography↩
2. 2018 consultant affiliation↩
3. PUMA research paper↩
4. OptArc account↩
5. Mycobacteria screening study↩
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