

**L'économie des images en sciences. Enjeux, modalités et impacts sur la production et la circulation des savoirs (XVIII<sup>e</sup>-XXI<sup>e</sup> siècles)**

**The Economy of Images in the Sciences. How does it affect the production and circulation of knowledge? (18<sup>th</sup>-21<sup>st</sup> centuries)**

Journées d'étude bilingues et hybrides  
**28 et 29 octobre 2021 – Institut National d'Histoire de l'Art, Paris**

JOUR 1 / 28 OCTOBRE 2021

9h / Accueil des participant.e.s

**9h30 / Mots de bienvenue et introduction**

Elsa De Smet, Anaïs Mauuarin et Laureline Meizel

**9h45 / PANEL 1**

Modération : Rafael Mandressi (CNRS/CAK)

**Giulia Simonini** (Technische Universität Berlin)

*The Naturalist Jacob Christian Schäffer and the Economy of Colored Scientific Images in the 1760s*

**Abstract:** Jacob Christian Schäffer (1718-1790) is mainly known for having invented the first washing machine and for his paper samples, which he produced with all possible plants. He was thus a practical man, who tried to exploit nature when the price of paper was skyrocketing and also to improve the conditions of human labor by means of new technology.

He made similar efforts in the field of scientific illustrations too. Schäffer was highly unsatisfied with poorly colored scientific images released by his colleagues and, even more, with black and white engravings that – he argued – should be “completely banned” from scientific publications. These were familiar issues within the scientific community, stemming from Linnaean authority, who regarded colors as an unreliable characteristic in the plant kingdom, and from Swammerdam who deemed pitiful to “cover” images of insects with colors. Their contempt for colored zoological and botanical illustrations was moreover justified by the fact that these were often water-colored by untrained workforce, resulting in “hideously, non-realistically, and absurdly colored” images (to quote Schäffer).

Nonetheless, Schäffer noticed that color was a significant trait to identify insects and became a staunch advocate of colored scientific illustrations. He therefore appropriated a method to standardize the coloring of scientific illustrations from his own practitioners but left in the hands of art experts (*Kunstverständige*), experienced painters (*kunstverständige Mahler*), or colorists (*Illuministen*) the duty to realize such a standard color chart.

The reasons for his disengagement are of purely economic nature. In the 1760s, there were no official schools to train scientific illustrators such as Spaendonck's “cours d'iconographie naturelle” at the Museum of Natural History in Paris (1796). Scholars had to care for their upbringing, to teach them the difference between a beautiful picture and a satisfactory scientific illustration, and to privately pay for the material needed. In 1763, Schäffer published his manifesto – *Erläuterte Vorschläge* – to radically change the system of image production in the scientific community and “to make the learning and exercise of natural science generally popular, easy and useful.” Colored images were thus not only necessary for some entomologists but could be exploited to popularize natural history, and thus to better sell Schäffer's and his colleagues' books.

This paper aims to discuss Schäffer's manifesto as a key text about the issues that scholars had to face in the production of colored scientific images in the second half of the 18<sup>th</sup> century and the solutions that Schäffer proposed therein compared to those suggested by others. In the context of Schäffer's attempt to popularize "science," *Erläuterte Vorschläge* gives furthermore interesting insights in the life of some scientific illustrators, who were very often artists in their own right, but their profession remained unrecognized and often underpaid.

**Biography:** Giulia Simonini is a graduate conservator (A.B.A. Bologna), art historian (M.A. TU Berlin), Ph.D. candidate in the history of science (TU Berlin), and a paleographer. Currently, she works in the sub-project *Colour Orders, Colourants and Colour Terminology in the Eighteenth Century* with Prof. Friedrich Steinle within the research project *Dimensions of techne in Fine Arts* led by Prof. Magdalena Bushart (TU Berlin <https://techne.hypotheses.org/100>). Previously, she worked in the research project *The Order of Colours. Colour Systems in 18th-century Europe* led by Prof. Dr Friedrich Steinle, and was assistant to Prof. Rafał Mąkała, to Prof. Aleksandra Lipińska (TU Berlin), to Dr Florian Schmaltz and Prof. Sven Dupré (MPI WG Berlin). Her Ph.D. thesis investigates European color charts in the 18th century.

**Yohann Guffroy** (École polytechnique fédérale de Lausanne, Laboratoire d'Histoire des Sciences et des Techniques)

*Quel coût pour un dessin technique ? Étude de cas du système économique de la Society of Arts (1770-1850)*

**Résumé :** Au cours des XVIII<sup>e</sup> et XIX<sup>e</sup> siècles, la production d'images techniques connaît une inflation sans précédent dans de multiples domaines tels que celui des manufactures, de la publicité ou encore des sociétés savantes. Ces dernières s'en servent notamment comme support de transmission de connaissances scientifiques et techniques à l'instar de la *Society of Arts, Manufactures and Commerce* fondée en 1754. Cette dernière occupe une place essentielle dans la galaxie des sociétés savantes du XVIII<sup>e</sup> siècle. Promouvant l'invention par l'intermédiaire de mises au concours, la Société appelle les candidat·e·s à soumettre leurs propositions sous forme d'un texte explicatif, d'un dessin et/ou d'un modèle, afin de les faire examiner par l'un des six comités de l'institution. Si l'invention satisfait la demande et est jugée nouvelle, elle est alors récompensée et transmise au comité des *Correspondence & Papers* afin d'être publiée dans l'organe de communication de la Société, les *Transactions of the Society of Arts*, qui était distribué aussi bien en Angleterre qu'en Europe. Le public peut alors prendre connaissance des inventions primées par l'intermédiaire de leur description et le plus souvent des dessins qui les accompagnaient.

Si des études ont été menées sur l'histoire de la Société et de ses prix [Hilaire-Pérez, 2000 ; Howes, 2019 ; Bryder, 2020], très peu de travaux se sont en revanche penchés sur les dessins d'invention et encore moins sur le système économique qui sous-tend leur publication. Dans cette étude, nous proposons de mettre en lumière les multiples relations économiques qui lient les différents acteurs qui permettent cette circulation de l'image scientifique (inventeurs, dessinateurs, graveurs et comité des *Correspondence & Papers*) mais aussi le coût à la fois économique et symbolique que représente la production de ces images pour une institution telle que la *Society of Arts*. Pour cela, nous nous appuyons notamment sur les *Minutes* du comité qui couvrent le premier siècle de la Société (1770-1850) et qui consignent de précieuses informations relatives aux discussions du comité portant sur les négociations et les transactions qui ont trait aux dessins. On cherchera par exemple à savoir si la rationalisation de la représentation graphique de l'invention que l'on observe autour des années 1820-1830 n'est qu'une décision d'ordre technique, au sens de l'ingénierie, ou si l'aspect économique entre en jeu. De même, on pourra se demander quel a été l'impact du passage de la gravure sur plaque de cuivre à la gravure sur bois dans le coût de la production mais aussi la qualité de l'image. Enfin, nous chercherons à mettre en

regard ce système économique avec celui qui sous-tendait la production des dessins de *patents* dans la mesure où la Chancellerie anglaise engageait les mêmes dessinateurs que la *Society of Arts*. La mise en comparaison de ces deux systèmes nous permettra d'interroger la spécificité ou non de l'image technique par rapport à l'image scientifique, elle qui est souvent laissée de côté lorsqu'il s'agit de questionner la production de connaissances scientifiques.

**Biographie :** Après des études d'histoire à l'Université de Paris, Yohann Guffroy a travaillé pendant un an et demi au sein du Laboratoire de recherche sur les Sciences de la matière au Commissariat à l'énergie atomique et aux énergies renouvelables sous la direction du philosophe des techniques Vincent Bontems. Il y a notamment été formé à la philosophie de Gilbert Simondon et la gestion des connaissances techniques en entreprise. Actuellement assistant-doctorant au Laboratoire d'Histoire des sciences et des techniques de l'École polytechnique fédérale de Lausanne, il y mène une thèse sur l'évolution du dessin d'invention en Angleterre entre les années 1750 et 1850 sous la direction de Jérôme Baudry et Liliane Hilaire-Pérez.

11h15-11h30 / Pause

### 11h30 / PANEL 2

Modération : Jérôme Lamy (CNRS, CERTOP/Université Toulouse - Jean Jaurès)

**Johanna Daniel** (INHA/Univ. Lyon 2, LARHRA)

*Diffusion des savoirs géographiques & économie de l'estampe : le cas de la vue d'optique (2<sup>nde</sup> moitié du XVIII<sup>e</sup> siècle)*

**Résumé :** À partir de 1750, la mode des vues d'optique gagne l'Europe : ces estampes ont la particularité d'être conçues pour être visionnées à travers un dispositif optique, qui accentue l'impression de profondeur et donne au spectateur l'illusion d'une figuration en relief. Présentant le plus souvent des sujets topographiques, la vue d'optique est à la fois un divertissement et un vecteur de diffusion des savoirs. Madame de Genlis, préceptrice des enfants d'Orléans, les mobilise pour l'enseignement des rudiments de la géographie, tandis que le physicien Poleni y recourt à des fins de démonstration des principes de l'optique.

Du fait de leur large diffusion, et de la grande diversité des espaces géographiques représentés, ces vues d'optique ont fortement contribué à la construction d'une culture visuelle géographique des hommes et femmes du XVIII<sup>e</sup> siècle. Si le spectacle offert par la boîte d'optique a été étudié par les historiens du pré-cinéma, ces travaux ignorent généralement les modalités de fabrication matérielle des gravures et les mécanismes économiques à l'œuvre dans la production des vues d'optique. Comme pour d'autres produits éditoriaux de l'époque moderne (illustration du livre scientifique, cartes géographiques), les motifs figurés sur les vues d'optique sont souvent de seconde main : les graveurs copient quasi exclusivement des estampes déjà sur le marché (suites topographiques gravées par de grands vedutistes ; illustrations de livres de voyage et de géographie). Comment et par qui sont sélectionnés les motifs propres à être vus dans l'optique ? Quelle est la part des « logiques de stock » dans ces choix ? En quelle mesure les attentes de la clientèle sont-elles prises en compte dans la constitution des catalogues d'éditeurs ? La comparaison de leur offre respective met en lumière des stratégies très différentes, tant dans la qualité du produit (exécution, souci de fiabilité de l'information géographique) que dans le choix des espaces représentés (typologie urbaine, territoires sélectionnés). Autant d'éléments qui ont infléchi la perception du savoir géographique par ceux qui consommaient ces estampes.

Une fois le motif sélectionné, les graveurs disposent d'une marge d'adaptation : ils peuvent modifier la composition d'ensemble pour l'ajuster au dispositif de visionnement et garantir l'effet optique recherché ou encore accommoder les détails aux horizons culturels des

publics visés. Autant de transformations qui nuisent à l'exactitude et la fiabilité des représentations et contribueront au rapide mais relatif discrédit de la vue d'optique.

La logique de stock, si elle s'applique au choix des motifs, concerne aussi le matériel d'impression : les planches de cuivre circulent d'un éditeur à l'autre, au gré des évolutions d'un marché de la vue d'optique de plus en plus segmenté et concurrentiel.

Dans le cadre de ma thèse, j'étudie précisément ces phénomènes de viralité, de copie, de contrefaçon et d'adaptation qui traversent la production de vues d'optique. J'ai constitué une base de données référencant 2000 motifs types, 3500 éditions et 10 000 exemplaires imprimés. En croisant approche quantitative, traitement computationnel des images à l'aide d'une intelligence artificielle, analyses formelles et matérielles plus traditionnelles, je cherche à reconstituer la génétique de ces images et analyser les circulations visuelles à l'échelle européenne. Confrontés à des données inédites issues des archives (catalogues de ventes, estimations de fonds, bilans de faillites, etc.), ces résultats apportent de nouveaux éléments sur l'économie de l'estampe demi-fine à l'époque moderne. Ils peuvent aussi, du fait de la nature particulière des vues d'optique - entre art, géographie et physique expérimentale - contribuer à la réflexion sur l'économie des images en sciences.

**Biographie** : Johanna Daniel est doctorante à l'Université Lyon 2 Lumière, sous la direction de Sophie Raux. Sa thèse porte sur la vue d'optique et le commerce de l'estampe semi-fine en Europe au XVIII<sup>e</sup> siècle. Chargée d'études et de recherche à l'INHA, elle a collaboré au Service numérique de la Recherche et travaille maintenant au sein du programme "Chorégraphies. Écriture et dessin, signe et image dans les processus de création et de transmission chorégraphiques (XV<sup>e</sup>-XXI<sup>e</sup> siècles)". Elle enseigne également l'histoire de l'estampe et les Humanités numériques à l'École du Louvre et à l'Université de Reims Champagne-Ardenne.

**Marion Bélouard** (INHA/Univ. de Limoges, CRIHAM)

*Les Oiseaux d'Amérique ou l'envol du marché : production et marchandisation du savoir naturaliste au début du XIX<sup>e</sup> siècle*

**Résumé** : Le 7 décembre 2010, la célèbre maison de vente Sotheby's enregistre la vente spectaculaire de 11,5 millions de dollars pour une édition originale des *Oiseaux d'Amérique*, ouvrage de 435 planches d'ornithologie en quatre volumes et au format gigantesque du double éléphant folio. La notoriété de leur auteur, le peintre naturaliste américain Jean-Jacques Audubon (1785-1851), peut expliquer en partie cette envolée du prix : icône de la préservation de l'environnement et de la *success story* américaine, l'artiste incarne les États-Unis. Toutefois, le record n'est pas sans précédent. Dès leur publication, à Édimbourg et Londres entre 1827 et 1838, la valeur marchande des *Oiseaux d'Amérique* dépasse amplement celles des ouvrages naturalistes contemporains – conséquence d'un coût de production démesuré, impliquant sur une période de onze ans, l'emploi de matières premières hors format, un savoir-faire d'exception dans le domaine de la gravure et de l'édition, mais aussi le financement d'expéditions pour l'observation de nouveaux oiseaux. À la fois objet de science et d'innovation par son système de représentation des spécimens à échelle un et dans leur environnement naturel, la « grande oeuvre » d'Audubon devient aussi, par sa technicité et sa qualité d'exécution, un objet de collection. Destinée à une élite principalement financière, elle fait ainsi basculer l'image de science dans la sphère du luxe et du capitalisme entrepreneurial. Si l'historiographie audubonienne, à partir des années 1960, s'est intéressée de près aux modes de production et de diffusion des *Oiseaux d'Amérique*, en décrivant notamment le système de souscription, de livraison et de division du travail mis en place, elle néglige toutefois de replacer la réalisation d'Audubon dans son contexte historique, et de comprendre la logique de marché qui la sous-tend. Or, en important et exploitant en Europe un discours scientifique élaboré aux États-Unis, Audubon s'inscrit de fait dans une stratégie commerciale atlantique qu'il s'agit d'étudier à travers l'histoire sociale et culturelle de la recherche de profit. Dans le cadre de ma thèse, je

m'intéresse à la réception des *Oiseaux d'Amérique* par l'analyse des différents espaces sociaux de consommation du savoir, tant publics que privés, en développant les intérêts politiques ou de sociabilité des souscripteurs. Cette communication propose ainsi de prolonger l'analyse de la *demande* par celle de *l'offre*. Comment Audubon parvient-il à transformer la connaissance en un produit commercial, de surcroît sur différents marchés – de l'art, du luxe, du livre – et des deux côtés de l'atlantique ? Se fond-il dans une économie classique de marché, ou au contraire, s'interpose-t-il de façon nouvelle, tel un « oiseau rare » ? À travers le cas d'étude des *Oiseaux d'Amérique*, et en comparant leur développement vis-à-vis de celui d'autres objets d'histoire naturelle, tels l'oeuvre de Thomas Bewick en Angleterre ou de Pierre-Joseph Redouté en France, la communication réfléchira aux moyens matériels et aux critères à l'origine de la valeur des images en sciences au début du XIX<sup>e</sup> siècle – esthétiques, matériels, d'innovation scientifique, ou d'exotisme ? –, et en particulier à la notion de marchandisation du savoir dans le contexte de l'entrepreneuriat capitaliste.

**Biographie :** Marion Bélouard est doctorante à l'Université de Limoges et chargée d'études et de recherche à l'Institut national d'histoire de l'art depuis octobre 2020. Elle consacre sa thèse au peintre naturaliste Jean-Jacques/John James Audubon (1785-1851), pour proposer une réinterprétation de son parcours et de son oeuvre sous l'angle de l'histoire des circulations atlantiques et des transferts culturels entre la fin du XVIII<sup>e</sup> et le milieu du XIX<sup>e</sup> siècle. À l'INHA, elle est associée au programme « Paradis perdu : colonisation des paysages et destruction des éco-anthroposystèmes ».

13h-14h30 / Pause Déjeuner

### 14h30 / PANEL 3

Modération : **Anne-Lyse Renon** (Univ. Rennes 2, PTAC/CAK/HEAD)

**Loïc Charles** (Univ. Paris 8 Vincennes Saint-Denis, INED) et **Yann Giraud** (CY Cergy Paris Université, AGORA)

*The Deceptive Art of Marketing Science: Otto Neurath's Pictorial Statistics in the United States (1928-1945)*

**Abstract:** Otto Neurath (1882-1945) is known as a social scientist, a philosopher of science, member of the Vienna Circle as well as a museum curator and inventor of Isotype, a method of visual representation of social and economic facts. Isotype allowed for the vivid yet allegedly neutral representation of significant economic and social relationships and facts, for example the waste of resources, human or otherwise, in the capitalist system. Neurath considered that these images empower people, especially the illiterates, by giving them access to a more sophisticated understanding of the social and economic laws that rule the world in which they inhabit. Thus, he believed that isotype should be exposed to them, especially in a new kind of scientific institution, the social museum. While Neurath's project was a political one, he claimed that was made his method of conveying knowledge was scientific. It obeyed rules that were inspired by his deeper epistemological tenets.

Neurath was not concerned with making his creation a profitable venture. Yet his statistical representations had to be carefully designed by a whole team of visual designers and artists, including artists such as Gerd Arntz and Peter Alma. This was costly and Neurath needed funds to finance the diffusion of his scientific images. This need became even more crucial as Neurath's Museum of Economy and Society in Vienna, which relied heavily on contracts passed with the city council, was closed down following the Austrofascists' rise to power. His team had to retreat to The Hague and to develop a new model to secure the means necessary to continue his scientific and museum activities.

Our contribution will document Neurath's search for funds and support in the United States, beginning with his collaboration in the late 1920s with the newly-founded Museum of Chicago and the Industry, and later with a network of American philanthropists that included the Russell Sage Foundation and the Survey Associates. The climax of this story features the opposition between Neurath and one of his former collaborators, Rudolf Modley. The latter sought to establish himself in the United States and to commercialize the Vienna Method, enlisting several government agencies and news outlets as clients. Neurath and his allies opposed Modley with the argument that the latter was betraying his scientific project for the sake of making profit. Conversely, Modley argued that the Vienna Method was nothing more than a tool or a service which should be adapted to the demand. As Neurath was prevented from establishing in the US, Modley was able to develop his own organization to create and market Neurath's-like visual statistics, but he moved away from the field of social sciences to that of graphic design. Throughout our narrative, we will argue that tensions mounted between the scientific and commercial character of Isotype.

Our contribution will rely on a wide variety of archival resources including the Neurath archives at Reading, the MSI archives at Chicago, the Survey Associates Records at the University of Minnesota, the Mundaneum archives in Mons and the Mary van Kleeck papers at Smith College.

### **Biographies:**

**Loïc Charles** is Professor of economics at the University of Paris 8 Vincennes Saint-Denis and a fellow-researcher at the French National Institute of Demographic Studies (Ined). His research deals with economic and social history, history of political economy and history of social sciences. He has published widely on these areas in such journals as *History of Political Economy*, *Journal of the History of Economic Thought*, *Past and Present* and *Revue d'Histoire moderne et contemporaine*. He has recently edited a special issue of the *Revue de l'OFCE on 18th Century International Trade Statistics: Sources and Methods* with Guillaume Daudin.

**Yann Giraud** is Professor of economics at CY Cergy Paris Université and a researcher at AGORA. His research deals with the history of twentieth century economics. His PhD dissertation studies the role of visual representation in producing and disseminating economic knowledge. His latest contributions deal with the role of textbooks in US economics education and the historiography of economics. His papers are published in journals such as *History of Political Economy* and *the Journal of the History of Economic Thought*, as well as the newly created French STS journal *Zilse*, of which he is a member of the editorial board. He recently co-edited the book *Economics and Engineering: Institutions, Practices and Cultures* (Duke University Press), with Pedro Duarte.

15h15-15h30 / Pause

**Drew Danielle Belsky** (York University, Science & Technology Studies, Global Labour Research Centre)

*Prearity Breeds Conservatism: Women and the Professionalization of Medical Illustration in the 20<sup>e</sup> century*

**Abstract:** Race, gender, & class are woven into the institutions, regulatory regimes, and economic arrangements that structure medical illustration as a profession. For decades, feminist scholars have critiqued the presumption of a white, male body as "standard" in medical illustrations, yet many anatomical and biomedical illustrations are in fact created by women, who have comprised the majority of professional medical illustrators in North America throughout the last century. In order to make sense of this apparent contradiction, it is necessary to evaluate the specific material, social, and economic processes by which imbalances of power and bodily autonomy become embedded in images. Drawing on archival sources, interviews, and participant observation with contemporary medical

illustrators, my research documents the material and social economies that both constrain and enable the production of medical illustrations and visualizations. By attending to the kinds of work that medical illustrators have undertaken to establish the field as a recognizable profession, I argue that biomedical visualization practices are structured not only by the materiality of rendering technologies and forms of visual expertise but also by social and economic contexts in which they are produced.

This paper explores the professionalization of medical illustration in the mid-twentieth century as “women’s work,” driven by concerns with economic stability and credibility within a male-dominated medical field. As historians of science Lorraine Daston and Peter Galison (2007) have argued, evolving concepts of objectivity in science are accompanied by perennial anxieties around representational practices, resulting in a devaluing of illustrators’ expertise. It is neither accidental nor natural that women dominate a field in which the efficacy of one’s labour depends on its imperceptibility as labour. Twentieth century medical illustrators were caught in a double-bind of needing to establish the value of their expert labour without calling attention to the constructedness of their images. In order to manage these epistemic anxieties while also ensuring their own economic stability, they embedded conventional epistemic values and gatekeeping mechanisms within existing structures of authority.

Over the course of the mid- twentieth century, a group of predominantly white, middle-class, female medical illustrators responded to the economic and epistemic precarity of the field by developing and institutionalizing legible structures such as training programs, educational standards, and professional associations. The often-invisible work of rationalization, social reproduction, and institutionalization enabled practitioners to externally substantiate their expert knowledge, their adherence to scientific values, and the economic value of their labour. I argue that practitioners were able to secure recognition, resources, and a discrete niche within a rapidly changing landscape of medical education, visual media, and publishing by positioning their work as both highly skilled and epistemically necessary, yet essentially subservient to the financial and moral economies of physicians, researchers, and publishers. By firmly aligning themselves and the institutions they built with hierarchies of biomedical knowledge production and emerging neoliberal economies, female medical illustrators succeeded in securing a degree of economic security for themselves, while at the same time entrenching structural barriers to diversity in the profession and in its products.

**Biography:** Drew Danielle Belsky est candidate doctorale en études des sciences et technologies à la York University de Toronto, Canada. Diplômée en arts plastiques (DNSEP, 2003) de l’École Supérieure des Arts Décoratifs de Strasbourg (maintenant appelé Haute École des Arts du Rhin), elle a par la suite obtenue sa maîtrise dans le cadre du programme interdisciplinaire de la York University en 2012 pour un projet au croisement des arts plastiques, des études critiques du handicap et des études des sciences et technologies. Bénéficiaire d’une bourse d’études supérieures du Canada au niveau du doctorat (BESC D) du Conseil de recherches en sciences humaines, ainsi qu’une bourse de réalisation de thèse doctorale des Associated Medical Services (AMS), son travail doctoral porte sur la formation des illustrateurs médicaux contemporains en Amérique du Nord. Cette étude ethnographique permet d’interroger les contraintes matérielles, sociales et économiques qui façonnent la représentation des corps en médecine.

**Geoff Cox, Andrew Dewdney, Nicolas Malevé** (London South Bank University, Centre for the Study of the Networked Image)

*Annotation Replay: Images and Labour in Machine Vision*

**Abstract:** Today, many scientific disciplines, increasingly large sectors of the industry and the Internet economy rely on computer vision algorithms to classify, filter, label, censor, augment, optimise, organize and take decisions. The recent breed of algorithms performing these tasks are often based on a deep learning framework. In this context, machine training

is of uttermost importance. The training consists of feeding a program with huge curated sets of data from which it “learns” regularities. The production of these data sets requires an infrastructure at web scale. Billions of images are culled from the internet. And a large population of precarious workers, recruited on crowdsourcing platforms, annotate this flood of images to describe their contents to machines.

The presentation analyses this double outsourcing. Where computer scientists were once producing the visual data sets in house or by commissioning photoshoots, they now rely increasingly on popular platforms of photo sharing. Where computer scientists were annotating themselves their collections of images or hiring domain experts, a significant portion of the annotation work is now delegated to crowdworkers. This double outsourcing entails the design of a large assemblage of acquisition and classification of images produced for free by amateurs and semi-professionals, and a new division of labour for the field of computer vision where platform workers take decisions that define the boundaries of what machines will be able to “see”.

To address these issues, the presentation draws upon an experiment of *annotation replay* conducted in the frame of the research project *Ways of Machine Seeing* started at the University of Cambridge and developed at the Centre for the Research of the Networked Image at London South Bank University. An annotation replay experiment involves the new annotation of a popular data set produced in a teaching environment where primary and secondary school students revisit the descriptions, tags, categories and image selection as well as experience the workflow underlying machine vision.

Based on the findings of this experiment, the presentation will reflect on the epistemic and political consequences of the change in the visual supply chain of computer vision and its dependency to the click work economy. It will ask where the relevant knowledge is produced in this vast assemblage. What is the nature of this knowledge and who contributes to it? How is it enabled through the various instantiations of the image from online communities to data sets? Following the trajectories of images offers a different way of interrogating machine vision's relation to knowledge and opens up a different pedagogical approach where what counts is to question how both humans and machines are trained to see.

### **Biographies:**

**Geoff Cox** is Associate Professor and co-Director of CSNI at London South Bank University, and Adjunct at Aarhus University. Publications include *Aesthetic Programming: A Handbook of Software Studies* (Open Humanities Press, 2020), with Winnie Soon; “Ways of Machine Seeing”, a special issue of *AI & Society* (Springer-Nature 2021), co-edited with Mitra Azar and Leo Impett; and *Live Coding: A User's Manual* (MIT Press 2022), a multi-authored book with Alan Blackwell, Emma Cocker, Thor Magnusson and Alex McLean.

**Andrew Dewdney** is co-director and co-founder of The Centre for the Study of the Networked Image, and a professor of educational media at London South Bank University. He has written and lectured widely on photography, new media and museology. His new book *Forget Photography* (2021) is published by Goldsmiths Press. He is currently working on an edited volume, entitled, *The Networked Image in Post Digital Culture* for Routledge.

**Nicolas Malevé** is a visual artist, computer programmer and data activist, who lives and works between Brussels and London. Nicolas has been awarded a PhD on the algorithms of vision at the London South Bank University in collaboration with The Photographers' Gallery. In this context, he initiated the project *Variations on a Glance* (2015-2018), a series of workshops on the experimental production of computer vision. He is a research associate at the Lucerne School of Art and Design and a post-doc at the Centre for the Study of the Networked Image at South Bank University.



## JOUR 2 / 29 OCTOBRE 2021

10h / Accueil des participant.e.s

**10h30 / PANEL 4**

Modération : **Charlotte Bigg** (CNRS/CAK)

**Serge Reubi** (Muséum national d'Histoire naturelle/CAK)

*Un projet commercial plutôt que scientifique. La photographie aérienne au service des sciences sociales durant l'Entre-deux-guerres*

**Résumé** : Le succès de la photographie aérienne dans les sciences humaines de l'Entre-deux-guerres est désormais connu. De la géographie à l'archéologie, l'histoire ou l'ethnographie, ces disciplines portent un intérêt vif à cette manière de représenter le monde depuis le haut. Les motifs de ce succès ont été identifiés, depuis une quinzaine d'années, par de nombreux chercheur-e-s en l'histoire de l'art ou en histoire des sciences. Parmi les vertus associées à la photographie aérienne dans les années 1920 et 1930, plusieurs s'inscrivent en effet dans des questionnements auxquels l'historiographie a plaisir à s'intéresser (exactitude vs précision, objectivité, renversement du regard, l'oeil de dieu...). Il en est une, absolument centrale dans l'esprit des scientifiques de l'Entre-deux-guerres, mais qui n'a guère retenu l'attention des historien-ne-s : la dimension économique de la photographie aérienne. Dans mon intervention, j'explore cet aspect du succès de la photographie aérienne. En introduction je rappellerai que l'historiographie des sciences, quoi qu'elle dise, s'intéresse généralement peu aux conditions économiques de possibilités d'un succès et soulignera les vertus de l'histoire économique des sciences. Je présenterai ensuite les discours des scientifiques sur les atouts économiques de ces images et les débats que leur production soulève (coûts, prix de revient, rendement, ...), pour constater que la question des coûts est extrêmement vive chez les scientifiques. Dans un deuxième temps, je m'interrogerai sur les conditions de production de ces images : le plus souvent, les photographies aériennes employées par les sciences humaines sont fabriquées grâce à l'appui gracieux des militaires ou en s'assurant le soutien d'entreprises privées, comme la Compagnie aérienne française. Dans un troisième temps, comme Olivier Lugon l'avait constaté, je rappelle que les entreprises aériennes survivent essentiellement grâce à la production des photographies aériennes, et je fais l'hypothèse que l'idée de se servir des photographies aériennes dans les sciences humaines n'est pas tant née dans le champ scientifique que chez les entrepreneurs de l'aéronautique. La photographie aérienne au service des sciences humaines est un projet économique bien plus que scientifique. Pour corroborer cette hypothèse, je constate pour terminer que les usages de la photographie aérienne dans les sciences humaines connaissent un déclin rapide dans les années 1930, qui ne peut s'expliquer par les raisonnements classiques de l'historiographie. En revanche la mutation du secteur aéronautique (nationalisation des compagnies aériennes, développement lucratif du transport de personnes) qui réduit le rôle des photographies aériennes dans l'équilibre financier des entreprises, y contribue.

**Biographie** : Serge Reubi est maître de conférences du Muséum, rattaché au Centre Alexandre-Koyré. Historien des sciences humaines et sociales, il travaille sur les pratiques scientifiques de terrain, l'histoire du voyage scientifique et l'histoire des collections savantes et des musées. A côté de ces enquêtes au long cours, il développe également un projet sur l'histoire des usages de la photographie aérienne dans les sciences humaines et sociales dans la France de l'Entre-deux-guerres.

**Solveig Jülich** (Uppsala University, Department of History of Science and Ideas)

*Selling Images of Life and Death: Lennart Nilsson and the Commerce of Medical Photography in the 20th Century*

**Abstract:** More than perhaps any other in his field, Swedish photographer Lennart Nilsson (1922–2017) has shaped our perception of the microworlds of the human body and of nature. Nilsson had no other formal education than elementary school. During the 1940s he established himself as a freelance press photographer, working on commission for Swedish and international picture magazines. He started to work on documenting human development, and in 1965 he won international fame with the photo essay “Drama of Life before Birth” in American *Life* magazine, soon followed by the release of the pregnancy guide book *A Child Is Born*. From about 1970 his laboratory with photographic and technical equipment was housed at Karolinska Institutet, the Nobel Prize-awarding medical university in Stockholm. Since then, Nilsson’s spectacular photographs of life and death have been circulated between various media and contexts. In 2009 the Swedish government awarded him the honorary title of professor for his exceptional “lifework in the service of knowledge”. This paper discusses economic dimensions of Nilsson’s famous photographs by placing them back in the historical context in which they were produced, circulated and debated. Recognizing the complicated process of bringing the images to the market, I emphasize the alliances, networks and exchanges between Nilsson, medical researchers, media industry professionals and other actors. The making of the photographs of biological materials, including legally aborted fetuses, required advanced visualization tools as well as the help of a team of researchers, doctors and technical assistants. This work was co-financed by scientific institutions and government agencies. In return, partners and collaborators from the academia were occasionally offered gifts in the form of pictures for illustrative, informative or aesthetic uses. However, Nilsson was the sole owner of copyrights of the photographs and they were mainly circulated as commodities in the international publishing market. These interactions between scientific and commercial realms were not without tensions. For instance, when Nilsson published scanning electron micrographs in a 1970 *Life* issue a dispute concerning copyright and credit was raised by the researchers that had shared their anatomical samples and insights with the photographer. Another source of disagreement was that Nilsson converted the black-and-white scanning electron micrographs into colour images to make them more commercially appealing. This annoyed researchers who reckoned the images to be manipulated or fake. Moreover, Nilsson was criticised for not sharing information about the imaging techniques used for producing the spectacular pictures of human development. The circulation of *A Child Is Born* did not contribute to the openness of knowledge and innovation in this respect. It may seem self-evident that Nilsson’s costly and advanced photographic work was always a commercial enterprise. Yet, this has been a sensitive issue in Sweden where the photographer often was portrayed as an idealistic “folk educator” or even a disinterested scientist. I end by discussing the implications of Nilsson’s story for the historiography of medical photography. In conclusion, the paper demonstrates that financial interests and values were deeply intertwined with the photographic activities of Nilsson throughout his career as well as the field as a whole.

**Biography:** Solveig Jülich is Professor of History of Science and Ideas at Uppsala University, Sweden. Her research focuses on late nineteenth-century to early twenty first-century history of reproduction, and history of medical imaging and media culture. She has contributed essays on the historical trajectories of Swedish photographer Lennart Nilsson’s images of embryos and fetuses in journals such as the *Bulletin of the History of Medicine and Social History of Medicine*. She is co-editor of the volumes *History of Participatory Media: Politics and Publics, 1750–2000* (Routledge, 2011), *Knowledge in Motion* (Makadam Press, 2018) and *Communicating the History of Medicine* (Manchester UP, 2020). Currently, she is directing the research programme *Medicine at the Borders of Life: Fetal Research and the Emergence of Ethical Controversy in Sweden*, <http://medicalborders.se/>.

**Miles Kempton** (University of Cambridge, Department of History and Philosophy of Science)

*Commercialising Zoology: The Granada TV-Zoological Society Film Unit, 1956-63*

**Abstract:** In April 1956, London Zoo became home to the world's first zoo-based TV and film unit. A joint enterprise between Granada TV – one of four programme companies comprising Britain's new commercial television service, ITV – and the Zoological Society of London (ZSL), the unit broke a decades-long collaboration between the BBC and ZSL. It was founded with two entwined aims: to produce profitable natural history programmes using London Zoo's world-famous collection of animals, and to accumulate footage for zoological research. Over seven years, it amassed some 500,000 feet of film. The footage was cut into seven television series on animal behaviour seen by millions in Britain and overseas, shown at scientific conferences, made available to educational institutions, and used in pioneering research into mammalian ethology overseen by its first director, Desmond Morris. In this talk, I unpack the dynamics of this collaboration between Granada and the ZSL. I elucidate the complex tangle of economic and epistemic imperatives created when zoologists and commercial television producers came together to make moving images of animal behaviour. Predictable tensions arose when the desire to exploit the easy entertainment value of animals collided with the concern to communicate serious zoological knowledge. Yet, I argue, Granada's peculiar commitment to public service broadcasting ideals also facilitated more seamless collaborative projects. I address the problem of the economics of moving images in this commercial TV/zoological unit by considering questions such as: How were ownership and usage rights negotiated? How did film circulate through the unit's diverse audiences? What modifications did film undergo to render it acceptable to, for example, a tea-time children's audiences one week and the audience of an international zoological congress the next? How were programmes conditioned by Granada's profit motive – e.g., the lucrative appeal of selling to international markets? This analysis will allow me to point out similarities and differences between the natural history production cultures of the BBC and ITV, intervening in a scholarly debate that has hitherto focused almost exclusively on the BBC.

**Biography:** Miles Kempton is a PhD student in the Department of History and Philosophy of Science at the University of Cambridge. He works on the history of the Granada TV-Zoological Society Film Unit, based at London Zoo between 1956 and 1963. More broadly, his interests lie in the history of science on British TV in the 1950s and 1960s, particularly ITV natural history programmes, and the development of primate and human ethology in this period.

13h00 – 14h45 / Pause Déjeuner

#### 14h45 / PANEL 5

Modération : **Serge Reubi** (Muséum national d'Histoire naturelle/CAK)

**Joris Mercelis** (Johns Hopkins University, Department of History of Science and Technology)

*Eastman Kodak and Scientific Photography: Image Economies in Twentieth-Century Astronomy and Tropical Biology*

**Abstract:** This paper explores the reasons of twentieth-century industrial corporations for supporting (or not supporting) the adoption of photographic techniques and evidence in the natural sciences. In the middle decades of the nineteenth century, photographic societies and journals had played a crucial role in making photographic knowledge and techniques

broadly accessible to scientists and many others. Once the modern photographic industry emerged from the 1880s onward, however, these societies and journals themselves lost access to commercially sensitive knowledge and know-how on which the (effective) use of photography in the sciences could depend. The recording of images in astronomy and nuclear physics, for example, required specialized knowledge in photographic emulsion technology, which leading twentieth-century photographic firms such as the Eastman Kodak Co. and Ilford Ltd. only disclosed under exceptional circumstances, if at all. Similarly, scientists looking to use photography in challenging environmental conditions—as with under-water and polar photography, for example—frequently depended on the photochemical and optical industries to supply them with tailor-made equipment. From these industries' perspective, however, the market for what could be highly specialized applications of photography in science was not always large enough to justify investments in the development of new techniques.

To gain a better insight into such tensions and dependency relationships between photographic firms and professional communities of scientists, this paper focuses on Kodak's collaborations with—and attitudes toward—astronomers and tropical biologists. Although astrophotography is among the best studied areas of scientific photography, the available historiography has not typically engaged with (as you put in the Call for Papers) the convergence and divergence between economic and scientific interests in this field. As I demonstrate in my study, Kodak's relationships and collaborations with astronomers in the United States generally were of a mutually beneficial nature, not least because Kodak's decisions to develop (or not) photographic techniques suitable for astronomical purposes were driven by considerations of scientific status and prestige rather than by (direct) financial goals. At the same time, Kodak's desire to maintain strict control over its emulsion and manufacturing knowledge and know-how did occasionally lead to conflicts. As tropical biology was a much smaller and less prestigious discipline than astronomy, it is remarkable that, in this field, too, a convergence of interests occurred at least temporarily. This convergence is evident in the mutually supportive relationships between two US-controlled scientific institutions in Panama, Kodak's Tropical Research Laboratory (1946-64) and the Barro Colorado Island Biological Station, a popular research destination for biologists from the United States and Europe that was run by the Smithsonian Institution from 1946 onward. This convergence, however, was only enabled by a mid-twentieth-century context of empire, visualized through photographic images of life in "the tropics." As a result, the balancing of scientific and economic forces shaping the "economy of images" in tropical biology was more politically delicate and shorter-lived than comparable efforts in US astrophotography had been.

**Biography:** Joris Mercelis is an assistant professor in the history of modern technology at Johns Hopkins University in Baltimore. His principal areas of specialization include the economic history of technology and science and the histories of chemical and photographic technology, science, and business (19<sup>th</sup>-20<sup>th</sup> centuries). He is the author of *Beyond Bakelite: Leo Baekeland and the Business of Science and Invention* (MIT Press, 2020) and a co-editor of two related special journal issues entitled "Commercializing Science: Nineteenth- and Twentieth-Century Academic Scientists as Consultants, Patentees, and Entrepreneurs" (*History and Technology*, 2017) and "Academic Entrepreneurship and Institutional Change in Historical Perspective" (*Management & Organizational History*, 2017). His main current research project explores the impact of multinational corporations on the global development of the sciences and the movement of scientific and technical knowledge through a case study on the Eastman Kodak Co. and the discipline of photographic science and engineering.

**Taylor Bradley** (University of Texas, Austin)

*Harvest Moon: The Lunar Orbiter Image Recovery Project and the Privatization of Space*

**Abstract:** To create *Error Sequences I-V* (2015), Maria Antelman printed NASA's first images of the moon as five 93 x 20 in. (236.22 x 50.8 cm) photographs. She gained access to the documents through the Lunar Orbiter Image Recovery Project (LOIRP), which was established by NASA, Caltech, SkyCorp, and SpaceRef Interactive to extract data from 2,500 reels of archival tapes that mapped potential landing sites for the Apollo astronauts. As part of my larger research project into Antelman's source material, this paper unpacks the economic factors involved in the resurrection and preservation of NASA's 1966-67 lunar reconnaissance survey in the twenty-first century.

In the early 2000s, NASA Planetary Data Systems and Caltech partnered with SkyCorp, SpaceRef Interactive, and NASA Ames Research Center to fund the \$1.175 million Lunar Orbiter tape recovery effort. What value did NASA's lunar maps from the 1960s have for SkyCorp and SpaceRef Interactive? To what extent were these organizations solely motivated "to recover the [endangered] history of the Apollo-era before it [was] gone forever," as SkyCorp CEO Dennis Wingo stated? Or did this project also conveniently assist NASA to revitalize the United States' love affair with space exploration, open Silicon Valley billionaires' checkbooks, and usher in a private-public partnership in space travel?

At a time when the US government's budget to advance research and technology for space exploration was at historically low levels, the tech industry emerged as a promising new source of funding for NASA. Likewise, the tech industry has been highly motivated to build relationships with the government to develop artificial intelligence, national security, and space mining contracts. What strategies did the LOIRP team leaders use to mobilize the preservation of the archival documents? How did they develop and grow their donor base? Who made up their network of donors? What roles have these images since played in producing scientific knowledge and attracting corporate investment? By outlining the economic interests that converged with the scientific and archival value of NASA's lunar maps, my paper examines the historical context that made the LOIRP successful. Furthermore, my research explores the broader ethical questions related to the social-political and environmental impact of the privatization of space.

**Biography:** Taylor Bradley is an art historian based in Austin. Bradley specializes in modern and contemporary art with a focus on the history of photography and conceptual art. She received her BA in Art History with distinction from Boston University (2008) and earned her MA (2012) and PhD (2019) from The University of Texas at Austin.

Bradley has published art criticism in *The Brooklyn Rail* and *Sightlines Magazine*, she currently serves on the board of Photography Network, and is the project manager for artist Juana Valdés. In the fall she will teach a course on the history of photography at the University of Houston.

**Estelle Blaschke** (Basel Universität)

*Supercomputers and the business of scientific imagery*

**Abstract:** The datafication of images combined with ever more potent data processing and storage capacities have significantly altered the ways in which information and knowledge is gained from visual material. Clustered in big data sets, image data can be machine processed, extracted and used for visual simulations and modelling, which, in the case of climate research or urban planning are the basis for conducting experiments and calculating projections. The talk will focus on the technological infrastructures that are put in place for computing on (and producing) scientific images on the example of the high-performance computing centre in Stuttgart (HLRS). As one of several "supercomputers", the HLRS caters the scientific community as well as the developing branches of industrial manufacturing and

production. It will draw on visual documentation and interviews conducted in the framework of the artistic-research project Image Capital (co-directed with Armin Linke) to shed light on the increasing dependency of scientific research on the outsourcing of computational services, including long-term digital image storage and visualisation as well as on the convergence of scientific and economic interests embodied in public-private ventures such as the HLRS.

**Biography:** Estelle Blaschke is a photography historian. She holds an interim professorship in media studies at the University of Basel and teaches photography history and theory at ECAL. Her research focuses on the theory of photographic archives, the circulation of images, image infrastructures and the history of digital photography. She is the author of the book *Banking on Images: The Bettmann Archive and Corbis* (Spector Books, 2016) and a member of the editorial board of the scientific journal *Transbordeur. Photographie, Histoire, Société*. In 2019, she edited the *Photographie et technologies de l'information* (Transbordeur no.3), together with Davide Nerini. With Armin Linke, she directs the research and exhibition project *Image Capital*, which will be on show at Folkwang Museum Essen, MAST Bologna and Centre Pompidou in 2022 and 2023.

### 17h15 / Mots de conclusion

Elsa De Smet, Anaïs Mauuarin et Laureline Meizel

